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Chemical Week

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May 16, 1959

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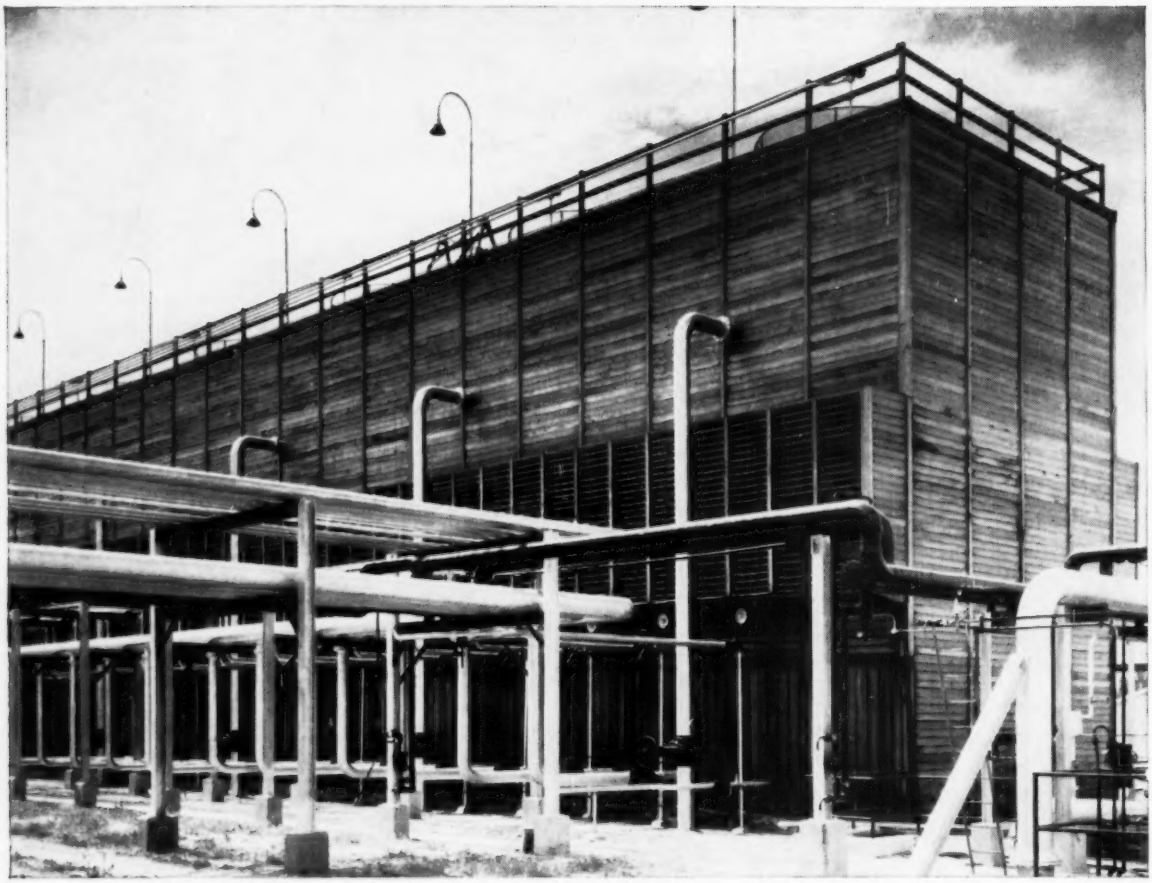

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Chemical Week

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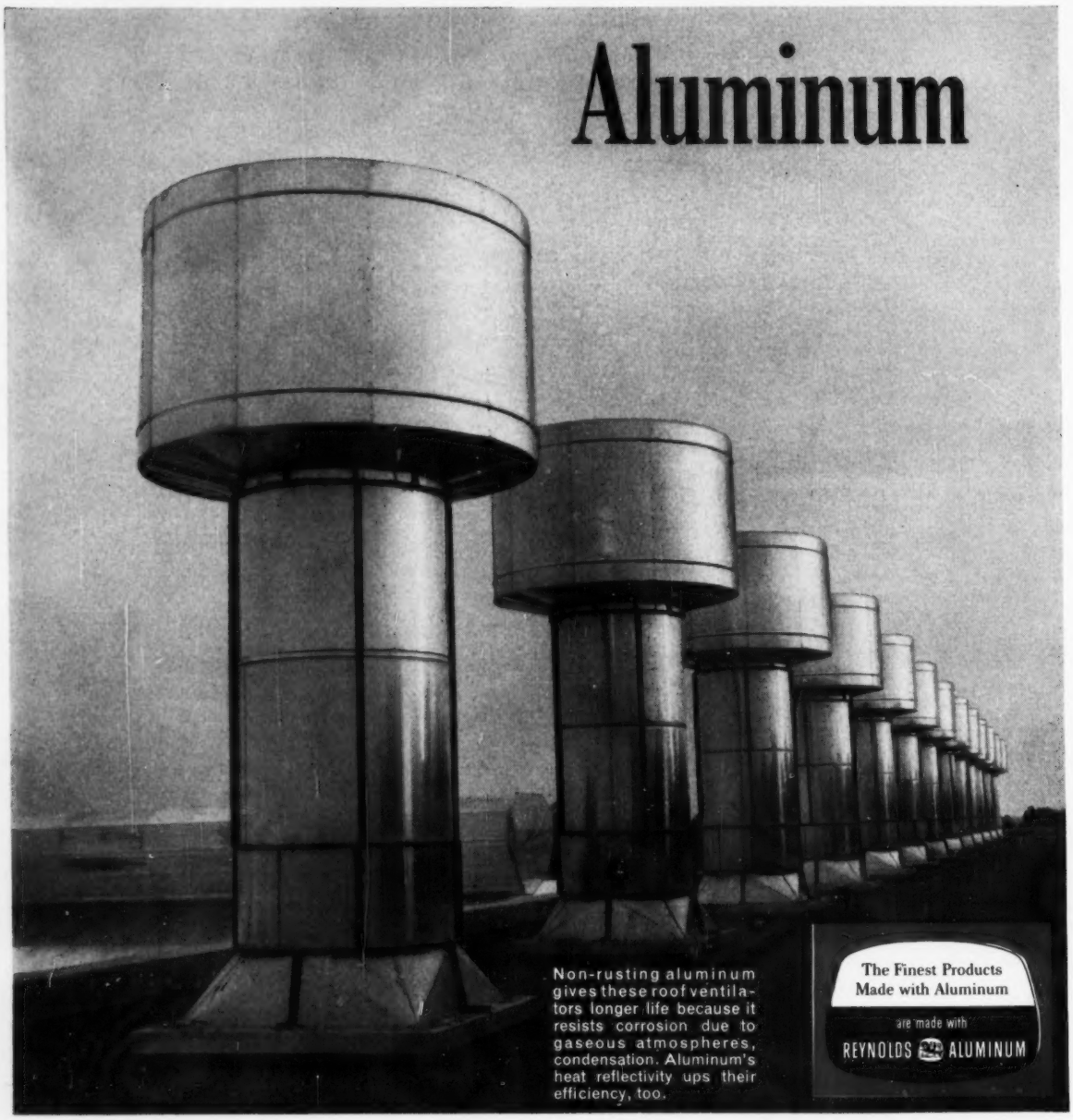


Non-rusting aluminum gives these roof ventilators longer life because it resists corrosion due to gaseous atmospheres, condensation. Aluminum's heat reflectivity ups their efficiency, too.

The Finest Products Made with Aluminum are made with REYNOLDS ALUMINUM

Reynolds Aluminum Improves Plant Appearance, Lowers Installation and Maintenance Costs

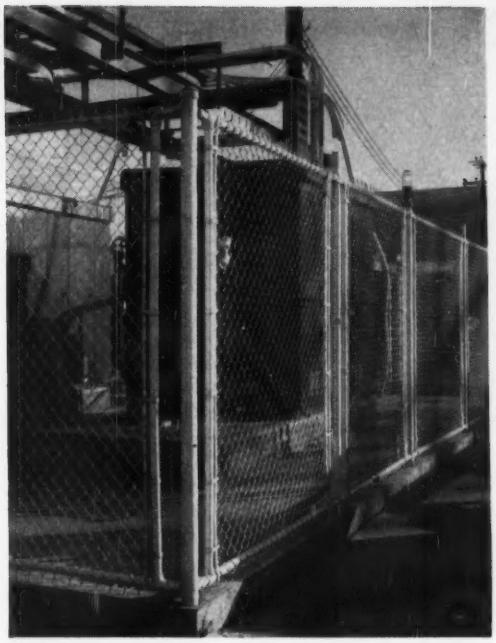
You can build low maintenance and lasting good looks right into a plant or equipment—by using strong, lightweight, rustfree aluminum in structural and building applications. Aluminum resists corrosion due to weather and gaseous atmospheres, so it needs little or no attention in a processing or refining plant installation. It can't rust ever, and it stays strong and new-looking, even in damp and corrosive places.

And maintenance costs aren't the only costs that can be lower, when you build with aluminum. Aluminum is the *lowest cost corrosion-resistant metal*, and its light weight (⅓ the weight of steel) can speed installation, cut building labor.

Thus, a catwalk using Reynolds Aluminum treadplate is not only maintenance-free—it often can be put up faster, at less cost than any other corrosion-resistant structure. Roof ventilators made with aluminum resist corrosion and won't rust—and, because of aluminum's heat reflectivity, are often more efficient. Aluminum chain link fencing never needs painting for protection, seldom needs maintenance of any kind.

Cost-cutting Reynolds Aluminum is finding its way into more and more applications in chemical and petroleum processing, not only in building and structural uses, but in piping, jacketing, heat exchangers, and other process equipment.

Before you plan your next installation, check *all* the costs, and learn how aluminum can save for you. For details, contact your local Reynolds office or write direct to *Reynolds Metals Company, P. O. Box 2346-CM, Richmond 18, Virginia.*



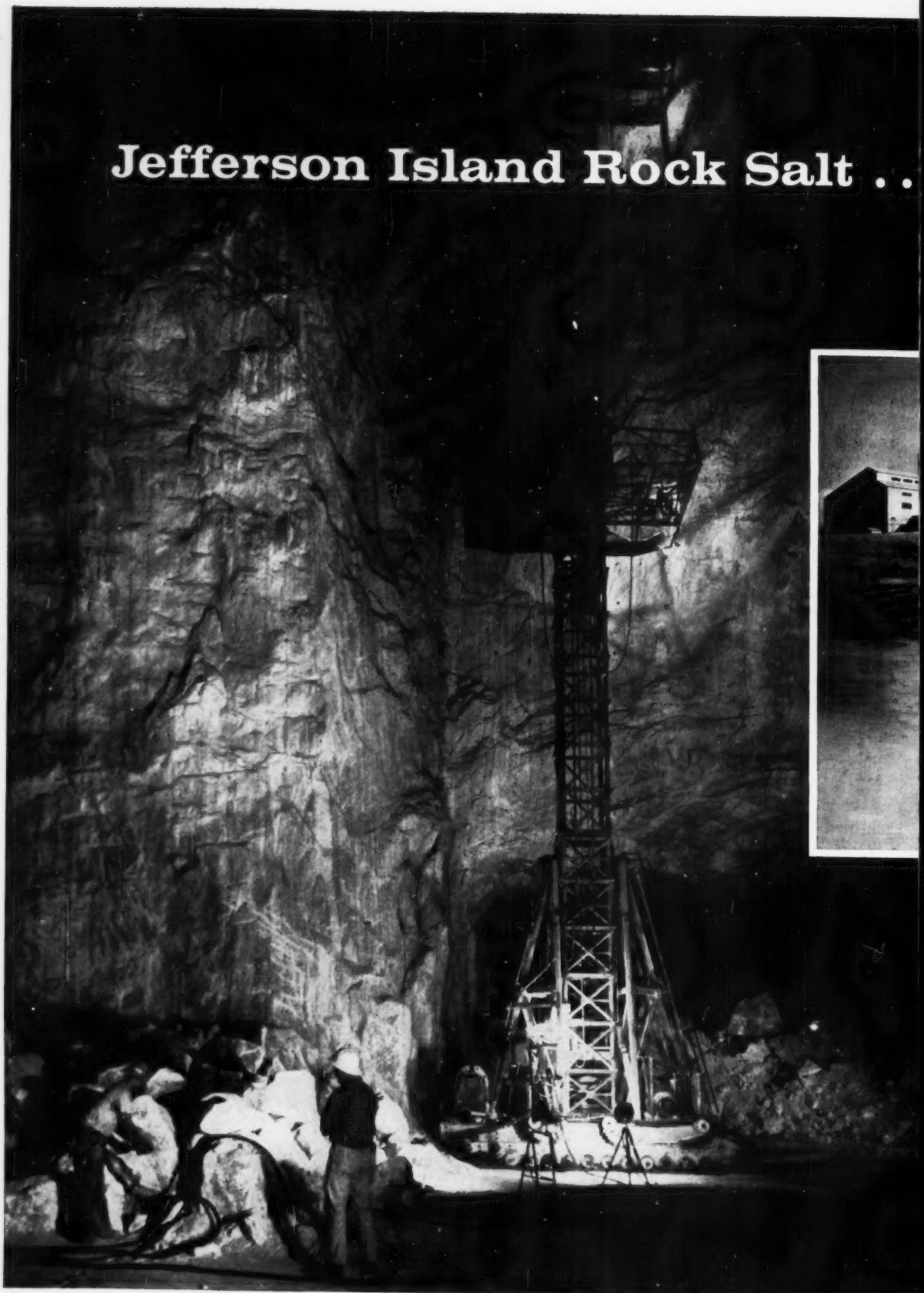
This fence will never need protective painting, seldom need any maintenance at all.

Upkeep on this stairway and conveyor is just about zero; aluminum stays bright and new looking, and it's non-sparking.

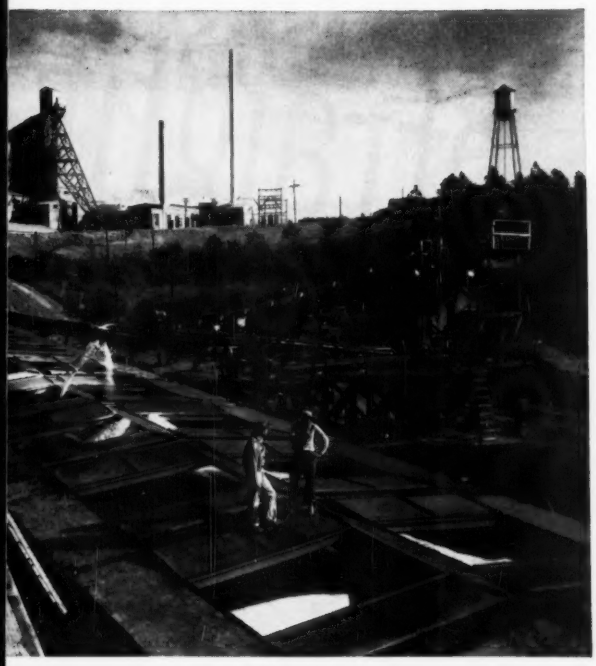
REYNOLDS ALUMINUM

Watch Reynolds TV show **"WALT DISNEY PRESENTS"** every week on **ABC-TV**

Jefferson Island Rock Salt . .



. . so pure that every chemical manufacturer benefits



The picture above shows rock salt being loaded into barges at Jefferson Island, La., for movement through the Inland Waterways. Many chlorine, synthetic rubber and other heavy industrial plants use barging to effect both economy and service.

For many years, rock salt from Jefferson Island has made possible many economies in chemical processing.

Mined in Louisiana from one of the world's purest deposits, this rock salt results in a consistently better end product—without the costly side reactions of impurities found in less pure salt. The big story is up to 99% purity at the source.

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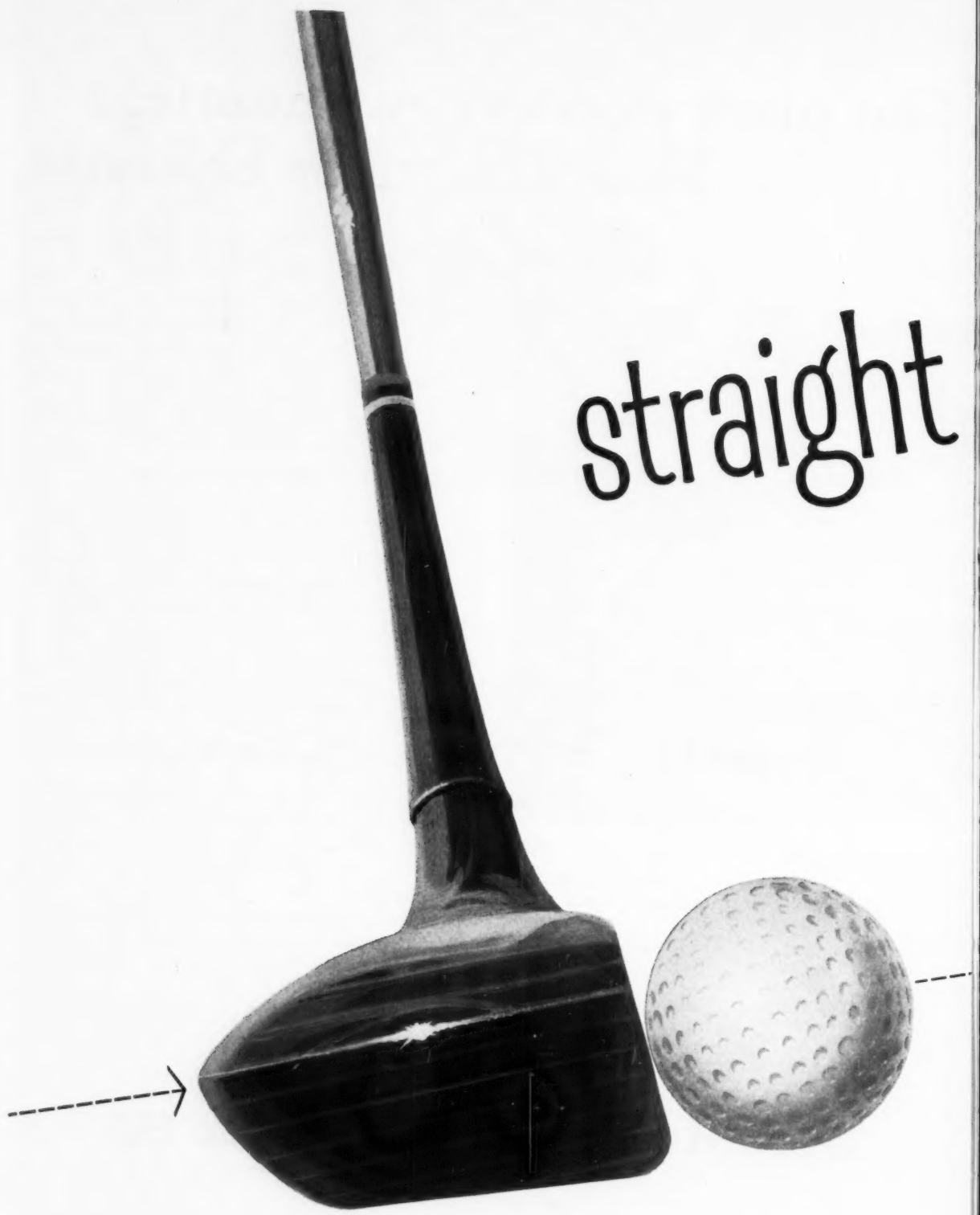
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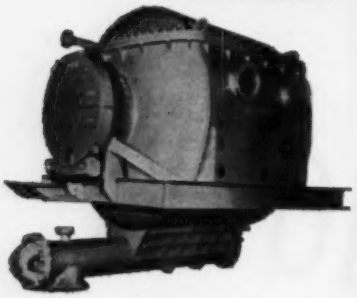

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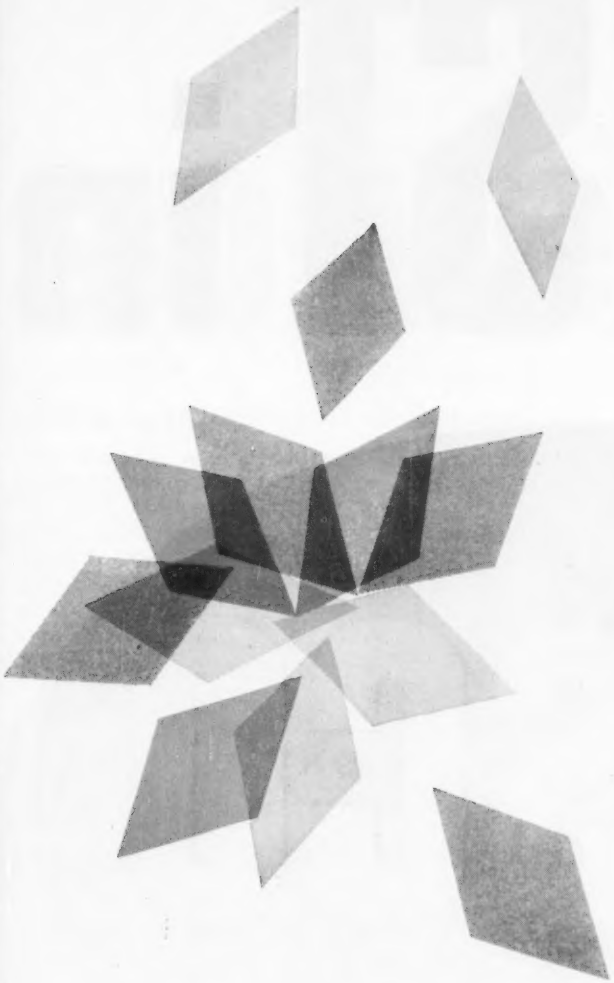

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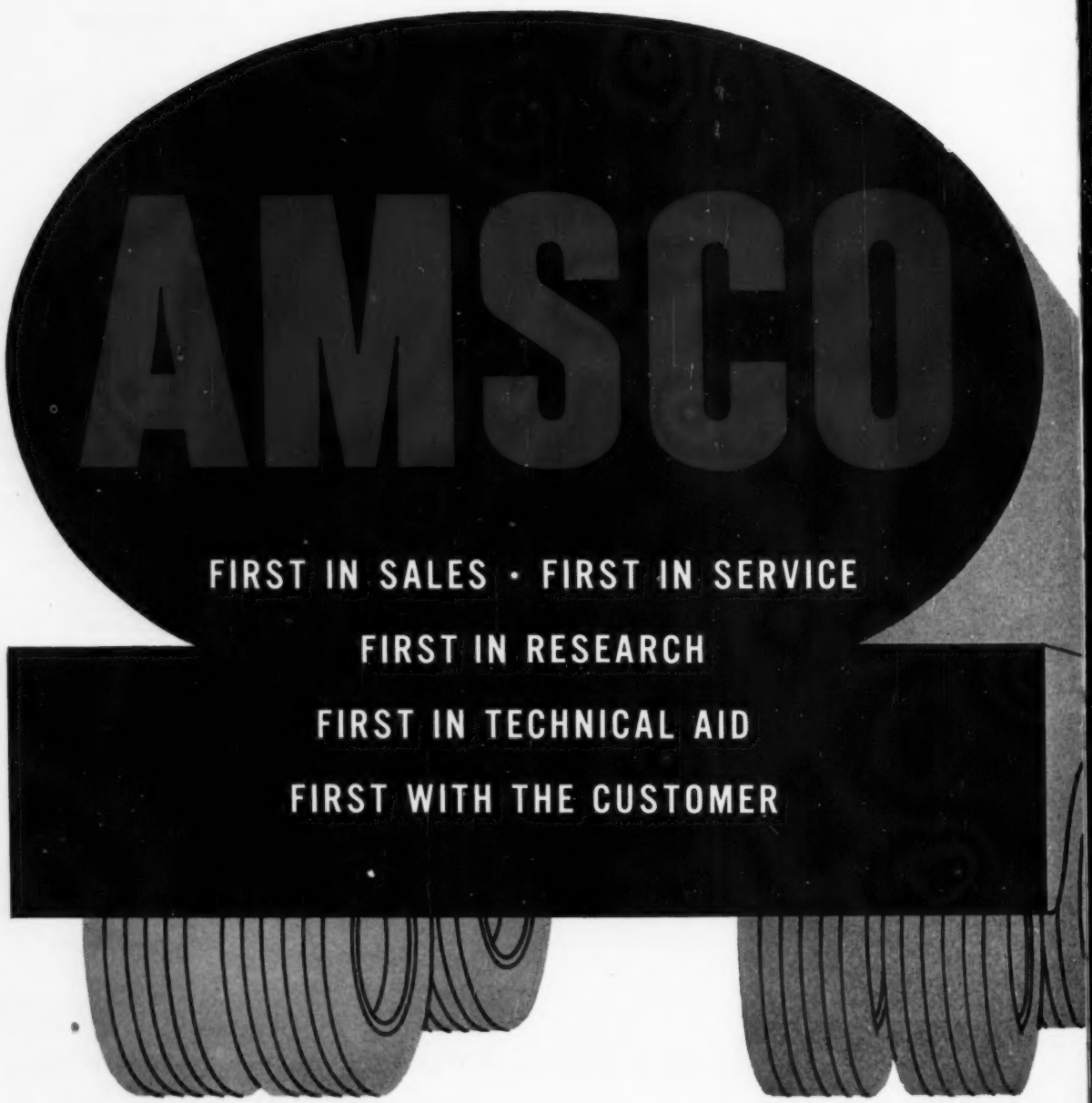
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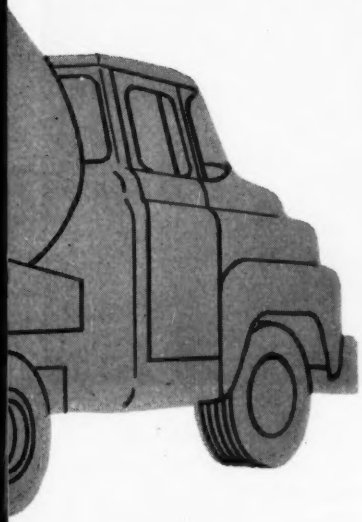

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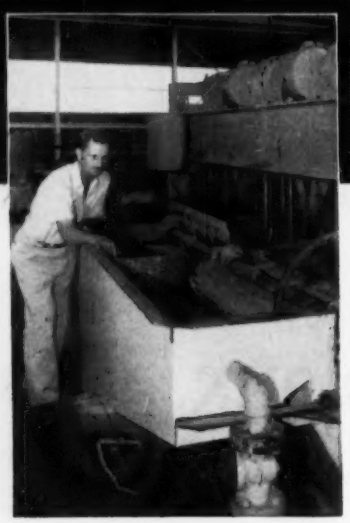

In the enlarged photo above, you see grains of sand on which General Mills' Alamines have been adsorbed. This *selective adsorption* provides the sand with a monomolecular film which has affinity for air bubbles. In this case, the undesirable sand is being floated away from phosphate which remains at the bottom of the tank.

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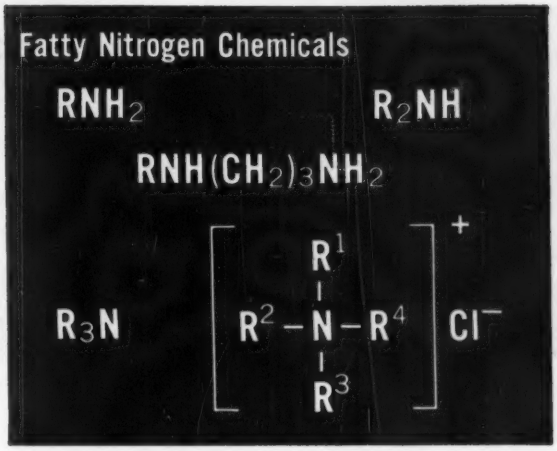

Above left, fatty primary amine; *above right*, fatty secondary amine; *center*, fatty diamine; *lower left*, fatty tertiary amine; *lower right*, fatty quaternary ammonium chloride.

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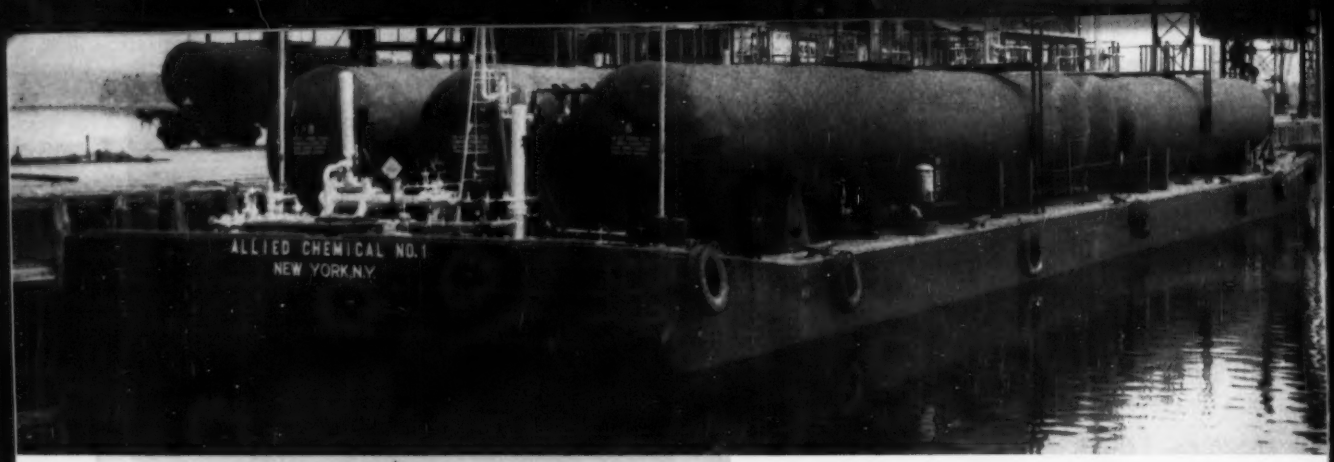

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CHEMICAL WEEK
May 16, 1959

Another family-held chemical firm will soon become publicly owned. Maywood Chemical Works (Maywood, N.J.) is being acquired by Stepan Chemical Co. (Chicago), which itself passed into the publicly held category only a year ago.

Stepan President Alfred Stepan, Jr., says his company is buying Maywood as part of its program to win new markets and new customers. So far, Stepan has picked up more than 80% of Maywood stock and has offered to buy the remainder. Total price will be about $5 million, and will not, Stepan adds, require equity financing.

Maywood President Albert Turner explains that the Stepan offer is being accepted because some of Maywood's senior stockholders find it a convenient opportunity to cash in their holdings. He says Maywood's financial position is "very sound," with about $2.5 million in cash; and that the AEC's policy to cut its lithium buying was not a factor. Maywood, he notes, has not been selling lithium to AEC; and the company expects to "hold its own" in lithium metal and chemicals. Other Maywood products: flavoring extracts, aromatic chemicals, synthetic detergents, cosmetic bases, pharmaceutical products, heavy drugs, and thorium and rare-earth products.

Maywood—formed in 1918 through merger of Thorium Chemical, Standard Essence and Schaefer Alkaloid—will continue as an operating entity. In fact, Turner says a number of new products are on the way. And Stepan indicates it is interested in further acquisitions.

•

Tail-enders in reporting first-quarter earnings are not tail-enders in performance. Food Machinery and Chemical sales were $86.9 million, up 24% over first-quarter '58; and net income jumped 34%, to $4.4 million. American Metal Climax revenues rose not quite 15%, but this led to a near doubling of earnings, from $3.9 million to $7.5 million. Chemical Process Co. (Redwood City, Calif.) registered a 44% rise in sales, to $1.2 million, and earnings mounted from $23,649 to $82,106. Stepan Chemical's sales and earnings dipped from $3.9 million to $3.5 million and from $243,666 to $155,921 respectively; but April sales of about $1.5 million were the company's highest monthly total yet.

W. R. Grace & Co. does not report quarterly figures; but at the annual meeting early this week, President J. Peter Grace told shareholders that first-half earnings are expected to be up 50%—or more—over last year's first six months. He said chemical activities are doing well this year—except that the linear polyethylene plant at Baton Rouge, whose breakeven point was put at 45%, operated at only 20% in '58.

•

Reynolds Metals plans to make and market a clear plastic wrap, Reynolon. In about two weeks, Reynolds—which already has a major

share of the aluminum-wrap market—will test-market the product. If tests are successful, it will go into commercial production.

Through Reynolds declined further details, it's believed the firm's Grottoes, Va., plastics plant, which already turns out polyvinyl alcohol and polyvinyl chloride films, will do the manufacturing.

•

More Russian chemical equipment contracts with western European nations have been signed. Among the latest:

• Courtaulds' $42-million deal to supply complete plants and processes for viscose rayon tire cord, acrylic staple fiber, and cellulose acetate yarn.

• A German consortium's deal to furnish $2.4 million worth of machines and equipment to several Soviet chemical plants.

The new Courtaulds contract follows one made last year; the company is now delivering equipment for a Russian cellulose acetate plant under an agreement signed last July. One difference in the new contract: Russia is departing from its usual cash-on-the-line policy, will pay for the latest order partly in sterling, partly in medium-term (probably five-year) credits.

The German group is headed by Ferrostaal, and includes Benno Schilde, Bad Hersfeld and Voith.

British chemical producers benefit from trade with Red China. During the first quarter, Briton's chemical shipments to China totaled $600,000. Nonferrous metal sales (chiefly copper wire) totaled some $7.8 million, were the largest category in the U.K.'s first-quarter exports to China, which totaled $19 million, compared with $8 million in the '58 period.

U.K. imports from China are also on the rise—from $10.3 to $14 million. Chemicals—principally raw materials such as rosin and albumen—accounted for just under $1 million.

•

Plans are under way for a petrochemical industry in Algeria, based on Sahara oil and gas.

Two groups of French chemical companies have been formed to study the feasibility of putting up polymer and copolymer plants in the turbulent French territory. One of them, Societe Algerienne Detude pour la Polymerisation des Olefines, includes Ethylene Plastique, Pechiney, Air Liquide and Huiles, Goudrons et Derives. Members of the other group, Societe de Petrochimie en Afrique du Nord, are Pechiney, Ethyl Synthese (subsidiary of Ethylene Plastique), Huiles, Goudrons et Derives and a bank, Union des Mines. The groups would produce various plastics. Plans are still in the preliminary stage; the amount of Sahara gas that will be available is still not known.

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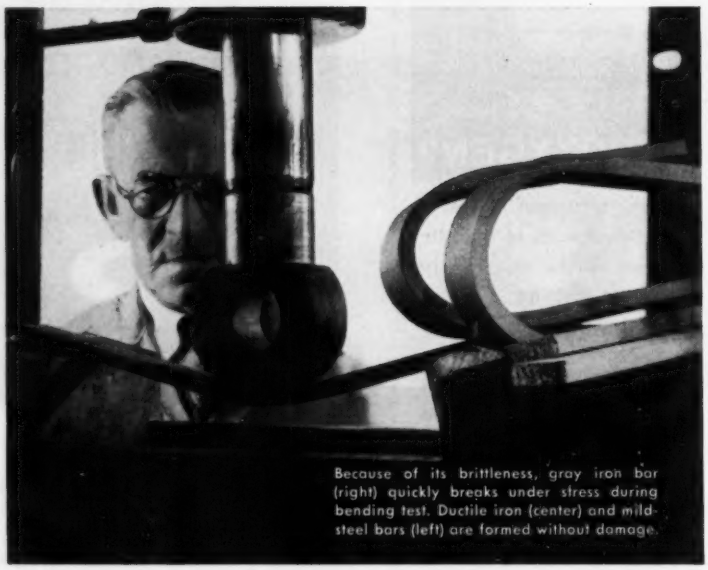

Because of its brittleness, gray iron bar (right) quickly breaks under stress during bending test. Ductile iron (center) and mild-steel bars (left) are formed without damage.

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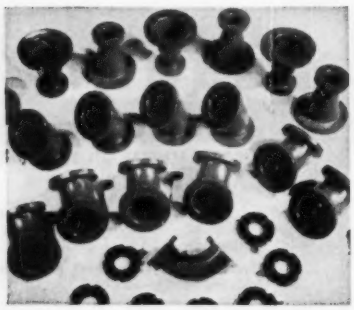
Now you can specify glassed-metal fittings and valves with the same confidence buyers have in Glasteel equipment.

New to the Pfaudler line is a series of glassed *ductile iron* fittings exhibiting physical and chemical properties similar to Glasteel 59's.



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To get the information, just circle the "A" on the coupon.

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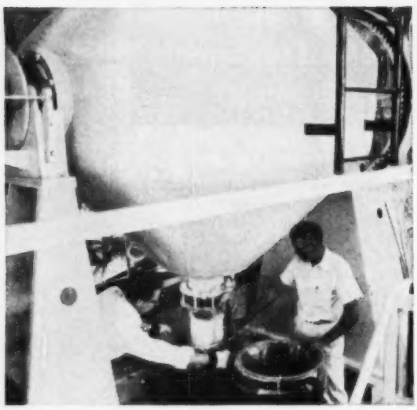

FLUIDICS AT WORK

How Upjohn saves 32 hours drying 2500 pounds of Orinase

Sixteen hours is all it takes for the Upjohn Company to dry and blend 2500 pounds of Orinase in the Pfaudler conical dryer-blender.

It used to take forty-eight hours to dry that much of Upjohn's oral antidiabetic in two straight vacuum dryers.

Upjohn says it also saves eight hours a week in materials handling time with the new dryer.

Since it's a pharmaceutical, the product poses a purity problem which is nullified by the noncontaminating glassed-steel construction of Pfaudler dryer-blenders.

Other companies, many handling corrosives, report similar savings, some of them cutting drying time by as much as 90%. The smooth glassed surfaces of the drying chamber are insensitive to all corrosives except hydrofluoric acid and hot alkalies above pH12.

Cleaning time is saved, too, since the interior is glassed. Hardly anything clings to glass which a simple flush won't remove. And, of course, the glass negates any loss to corrosion or possible product contamination. Like most Pfaudler glassed products, the dryer-blender is unaffected by any acid even up to 212°F. with the sole exception of hydrofluoric acid.

Besides drying and blending, this Pfaudler machine will impregnate, concentrate, react, or coat in one operation. Since you buy just one machine, you save capital investment, floor space, process time, and materials handling costs with it.

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There are Pfaudler Permutit plants in operation in all the major industrial areas of the free world . . . plants in Great Britain (Enamelled Metal Products Corp. Ltd.), and Germany (Pfaudler-Werke A.G.) for the European market . . . In Mexico (Arteacero-Pfaudler, S.A.), for the Latin-American market . . . and in Japan (Shinko-Pfaudler Co. Ltd.), for the Far East.

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For details on any of these operations as well as the location of Pfaudler Permutit representatives in various countries, write to either our Permutit or Pfaudler Divisions.

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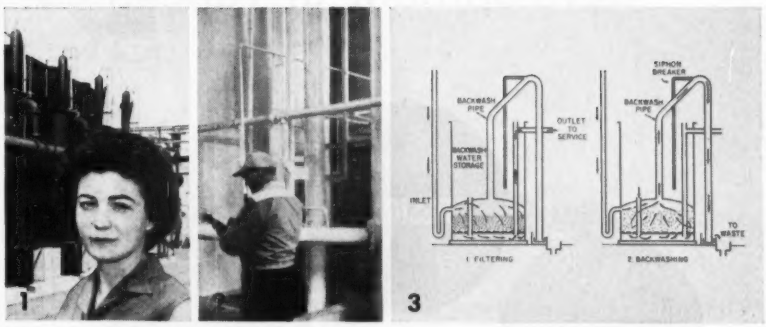

FLUIDICS AT WORK

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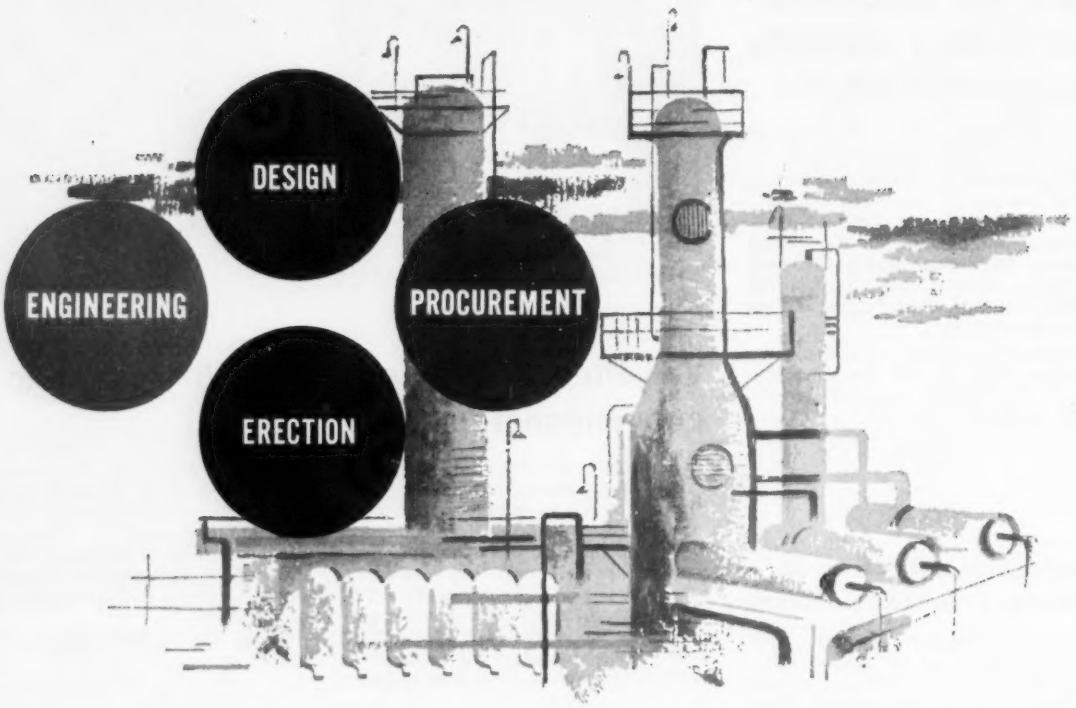

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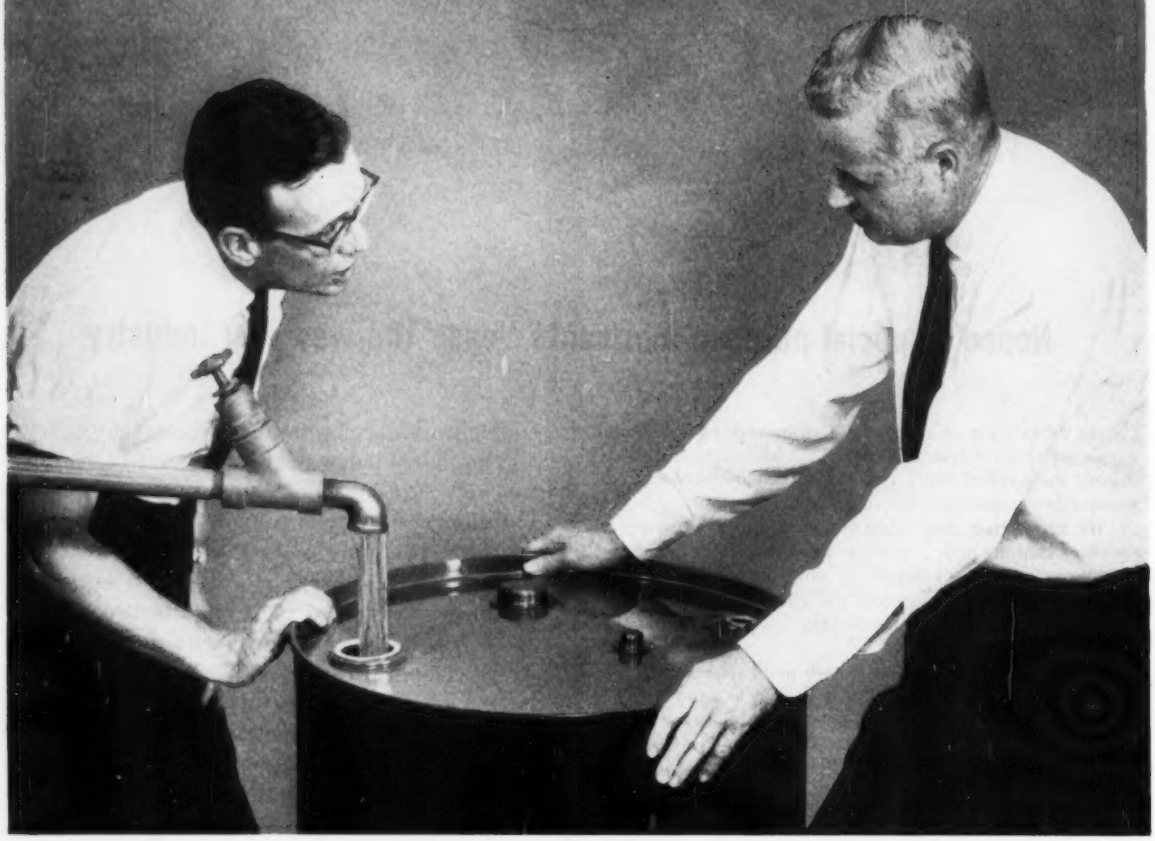

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VIEWPOINT

No one should be ashamed of corporate profits. If you want a good reason why, read these highlights from a statement by U. S. Steel's Roger Blough. Blough's remarks were presented to a Congressional committee considering the "price notification" bill.

MOST PEOPLE believe, I suppose, that a corporate profit is cash that is left over in the till after all the necessary payments of a business have been made. But that, of course, is not true.

In a capitalistic society, the only way to acquire the tools of production is through profit — the reinvestment of profit, or the investment of savings in the expectation of profit. There is no other way. And the only purpose for which a corporate profit can be used is to pay for the use and improvement of the tools of production — the plants, machines, furnaces, mills, mines, inventories and all of the other capital facilities necessary to the production process.

The truth is that a corporate profit is what is left over after all the necessary payments except one have been made—the payment for the use of the existing tools of production and for the addition of new ones through direct reinvestment. Of all the expenditures of a business, this payment for tools is without doubt the most important to our national growth and survival.

When a corporation has met its payroll, provided for depreciation and its federal income taxes, paid all its other bills, it has not yet paid one single cent for the use of the tools that its shareowners have provided for it. And since there is nothing left but profit out of which to pay for that use as well as for new tools, it is clear that the size of the profit determines the quantity and the quality of tools that an enterprise can command.

Thus, the simple fact is that a profit is not something that a corporation gets and keeps in the till. It is something it pays out of the till for the use and improvement of tools.

It may seem to some of the misguided almost a public service to tax corporate profits away, to bargain them away, or to control them away. But can we afford to tax, bargain or control away the tools of production upon which the nation depends for its very existence and survival?

How much longer dare we ignore the fact that the prospect of profits and the presence of tools are the selfsame thing — and that you can't have one without the other?

When will we stop beating about the bush and recognize the undeniable truth of one simple axiom: that less profit means fewer tools—or poorer tools. And this, in turn, means less efficiency, higher production costs, higher prices, shrinking markets, diminished purchasing power, fewer jobs, declining industrial strength and a dangerous impairment of our national security.

Let us suppose, for a moment, that our people are taught to scorn profits, and that corporate profit margins thus become smaller and smaller. What must American industrial corporations do to prolong their survival as long as possible?

Well, for one thing, they will have to curtail or postpone, wherever possible, every expense that is not immediately necessary to the production process — and a leading item of expense under this category is research. Last year, American industry spent more than $8 billion on research. Is it good public policy to reduce these vital expenditures at a time when our national survival clearly depends upon our ability to maintain our scientific and technological advantage over the Iron Curtain countries?

If the profit curtailment goes further, what must the surviving corporations do then?

Well, there may be no profits left for reinvestment in the business — to develop new sources of raw materials, or to modernize plants and machines.

Along with that, the corporation will be forced to reduce its payments — in the form of dividends —for the use of the tools its owners have provided. It will thus be unable to attract the capital necessary to provide for growth.

And at the same time, the corporation will lack the ability to replace its worn-out tools and facilities. This is a task that profits were never supposed to do — the funds provided through depreciation should perform this function. But in these days of inflation, under the outmoded depreciation laws that now prevail in this country, a large part of the reported profits of corporations have become mere phantom profits that must be used to make up the depreciation deficiency.

So if the philosophy here being advocated is successfully pursued to its ultimate conclusion, the only possible result must be the gradual destruction of the greatest industrial machine the world has thus far known.

I do not believe that this is the end the United States wishes to achieve — or that it is the intended goal of those who today are teaching our people that corporate profits are inimical to the public interest.

Any businessman would be proud of such a definition. All businessmen should be proud that our viewpoint has such a forceful spokesman.—ED.

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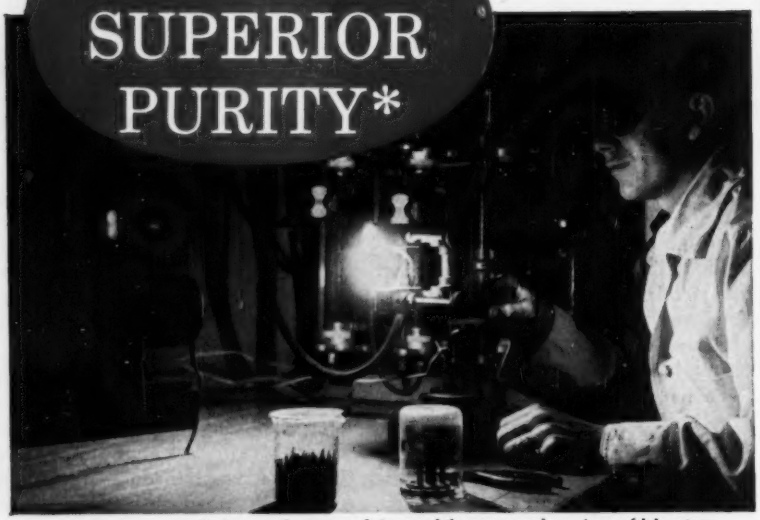

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OPINION

Hard-Hitting Solution

TO THE EDITOR: Please accept my thanks and appreciation for the splendid, hard-hitting "letter-to-the-editor" by Maurycy Bloch in your Feb. 21 issue. His recommendations, if followed, will in my opinion help solve some basic problems confronting the individual scientist and the nation, and in so doing will make life more rewarding for both. Mr. Bloch in turn is to be commended for putting his finger on some pressing needs, and the more so for practicing what he preaches.

MIKE HECHT
1429 Central Ave.
Deerfield, Ill.

Urethane Coating Price

TO THE EDITOR: . . . Regarding our manufacturing of urethane coatings . . . we should like to call to your attention that your article (*April 11, p. 48*) misquoted the price of our coating. It's $5 per quart, not per gallon.

R. D. ROOT
General Manager
Poly Form Manufacturing Co.
Escondido, Calif.

MEETINGS

American Institute of Chemical Engineers, 40th national meeting, Muehlebach Hotel, Kansas City, Mo., May 17-20.

Chemical Specialties Manufacturers Assn., 45th midyear meeting, Drake Hotel, Chicago, May 18-20.

Instrument Society of America, 1959 Fifth Annual Symposium on instrumental methods of analysis, Shamrock-Hilton Hotel, Houston, Tex., May 18-20.

Chemical Market Research Assn., annual meeting; forecast of what's ahead in plastics, petrochemicals, nitrogen, surfactants, industrial gases, pharmaceuticals, boron compounds, pesticides and dibasic acids; Plaza Hotel, New York, May 20-21.

Chemical Institute of Canada, 42nd annual conference, Halifax, N. S., May 24-27.

Design Engineering Show and Conference, Convention Hall, Philadelphia, May 25-28.

Fifth World Petroleum Congress, Coliseum, New York, June 1-5.

Material Handling Institute, Exposition of 1959, Public Auditorium, Cleveland, June 9-12.

Depreciation Reform—

Why Industry Needs A Modern Tax Policy

A shockingly large proportion of our industrial plant and equipment is obsolete. As indicated by an earlier editorial in this series, over $95 billion would have to be spent —and spent soon—to bring our industrial facilities up to the best modern standards. Yet plans for 1959 call for little more than $30 billion of actual spending—barely enough to make a start on this backlog of modernization.

At the heart of the problem of obsolescence is a federal tax policy that discourages business from replacing inefficient facilities. It is the purpose of this editorial to spell out a tax reform Congress can make this year—with little cost in terms of tax revenue—that would go a long way toward removing the barrier to modernization of plant and equipment. This reform is a more realistic system of tax deductions for depreciation and obsolescence of productive facilities.

A Barrier to Modernization

Industry abounds with examples of old and obsolete facilities—despite large expenditures made in the past few years. Two-thirds of our metalworking equipment is over ten years old. Over half the capacity of our chemical process industries was installed before December 1950. Only a minor fraction of our railroad freight moves in new freight cars or the new push-button freight yards.

The tax law bears a large part of the responsibility for this lag in modernization because of its important influence on business investment in plant and equipment. For many years the tax law has permitted as a deduction from income "a reasonable allowance" for wear and tear and obsolescence of productive facilities. These annual deductions affect business investment in several ways.

- They are the way a company recovers its investment in plant and equipment.
- They determine in large measure, the amounts of money that are spent each year to replace and modernize facilities.
- Furthermore, the schedule for depreciation often determines **when** a specific machine or building is actually replaced.

The law requires that depreciation deductions be spread over the "useful life" of a building or machine. But the periods of useful life for tax purposes today still depend heavily upon tables drawn up by the Treasury almost 20 years ago. These tables reflect the replacement practices of depression years. Also, they were compiled at a time when the pace of technological progress in industry was much slower than it is now. **For nearly all types of equipment the indicated period of useful life is longer —sometimes much longer—than most experts consider realistic at today's rate of technological advance.**

The result of these outmoded depreciation schedules is that the recovery of investment is dragged out, and the replacement of obsolete equipment is delayed.

In The Right Direction

Congress should establish, by law, the right to use shorter depreciation periods on productive equipment. It should do so in a way that would free industry from obsolete concepts of the rate of technological change and would provide incentives to install new equipment and produce new products.

The tax reform act of 1954 made some progress in this direction—but not enough. It introduced new methods for calculating depreciation—the declining balance and the sum-of-the-years' digits—which enable a business to recover most of the investment in a new facility in the early years of its useful life. However, these new methods do not accomplish their desired purpose when the supposed "useful life" is still an unrealistically long period of years.

Industry is by no means free from blame for the failure to bring depreciation policy into line with the needs of a modern, growing economy. According to Joel Barlow, president of the Tax Institute, "management has largely ignored the Commissioner's invitation . . . to come into the Internal Revenue Service office and make a case for shorter depreciable lives by establishing technological obsolescence."

The failure of many companies to see their own interest in more realistic depreciation not only holds them back from modernizing their own facilities but also lends support to the Treasury in its continued adherence to an outdated policy.

A Suggestion For Reform

An excellent model for reform of the depreciation policy in our tax law is the system used successfully in Canada for a decade. In Canada, all productive equipment may be depreciated at relatively fast rates assigned to each of 14 broad categories. The Canadian system permits depreciation up to twice as fast as the antiquated tables of useful lives now followed in the U. S. It also gives the individual business far greater flexibility in determining depreciation schedules that fit its own needs and experience.

For example, in the category or "bracket" covering general machinery a taxpayer in Canada may depreciate up to 20% of the machine's value annually, on a declining balance basis. In the U. S. the fastest rate at which many types of machinery can be depreciated is only 10%. In other categories, from tools and dies to buildings and pipelines, the Canadian system also allows faster depreciation and provides greater incentive to invest in new facilities.

The cost of this reform in terms of lower tax revenue would be small—probably less than $500 million in the first year. And even this would merely be postponed, not permanently lost. Indeed, there is a very good prospect that tax revenue would not suffer at all. The increase in spending for new plant and equipment resulting from this tax reform would mean an increase in wages and profits—and therefore in taxes—in industries that produce machinery and other capital goods.

A realistic tax policy on depreciation would provide a badly needed incentive for industry to replace obsolete and inefficient facilities with up-to-date plants and equipment. It would step up our rate of technical advance and economic progress. And it would put U. S. industry in better shape to meet the growing competition from other countries that have grasped the advantages of fully modern technology.

This message was prepared by the McGraw-Hill Department of Economics as part of our company-wide effort to report on opportunities for modernization in industry. Permission is freely extended to newspapers, groups or individuals to quote or reprint all or part of the text.

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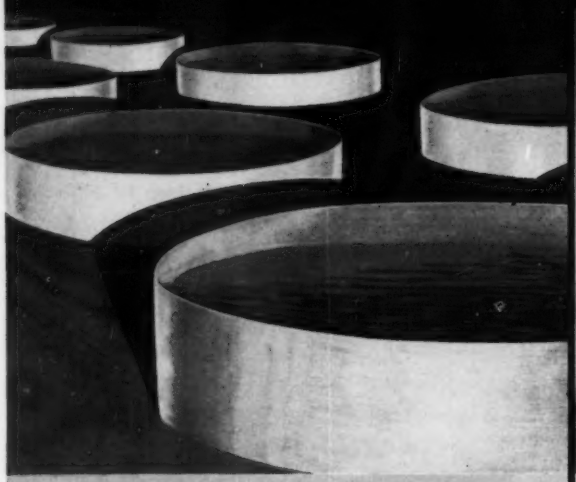

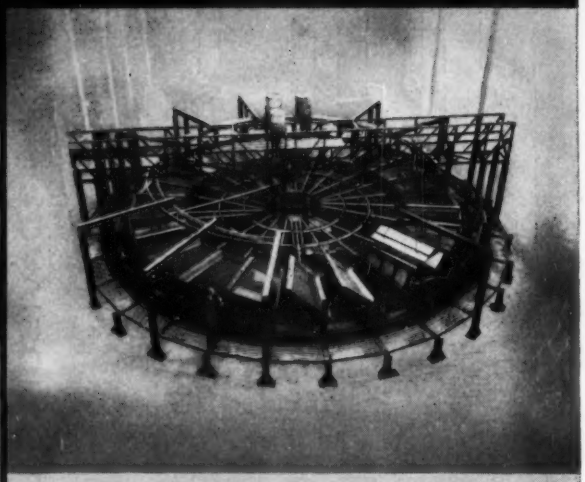

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Low-molecular-weight polyethylene has unusual combination of properties

Use of Unique Wax-Like Resins Expands Rapidly

PRODUCERS OFFER SEVERAL TYPES

Without a doubt, polyethylene is the fastest growing plastic. Predictions are it will be the first billion-pound-a-year plastic.

Conventional polyethylene resins are available in molecular weights ranging from only a few hundred to approximately 50,000, those at the upper end being more suitable for plastic molding and extruding, those at the lower end finding varied and extensive use as a synthetic wax.

Recent reports indicate renewed interest in the low-molecular-weight resins, probably because of the variety of types now available that meet specific formulating and performance requirements in many different industries.

For example, in the *packaging* field, paper coaters and converters are applying certain low-melt types of polyethylene directly to paper, using modified melt-coating equipment. Such coatings, applied as a fluid, penetrate well and assure good adhesion to paper stock. Of interest to paper converters and packaging engineers also is the fast heat-sealing cycles and short dwell times of these polyethylene coatings.

The low-molecular-weight resins also have application in the *paper converting* industry as upgrading modifiers for paraffin and microcrystalline wax blends. Their presence improves gloss, blocking temperature, resistance to cracking, flaking and abrasion, as well as resistance to thermal shock.

Their good flow characteristics at moderate temperatures also make the low-molecular-weight resins useful in *cast-*, *slush-*, and *rotational molding* operations for novelties, art objects and reproductions. No curing is necessary, the articles solidify simply on cooling. They are easily removed from the molds without release agents. Rejects may be melted for re-use.

In *liquid* and *paste polishes* for floors and other surfaces, the low-molecular-weight polyethylene resins contribute high gloss, hardness and durability, as well as anti-slip characteristics and resistance to scuffing and yellowing. Both emulsifiable and nonemulsifiable types of resins are available.

Their excellent color, compatibility with dyes, pigments and waxes and their high melting point (compared with paraffin) make these resins excellent additives for upgrading *candle wax* and *crayons*.

They are useful, too, as a wax coating for the reverse side of *carbon paper*. Coatings of high gloss, good hardness and low curl can be obtained.

Added to certain types of *rubber*, low-molecular-weight polyethylene resins provide excellent calender and mold release characteristics without appreciably affecting the physical properties of the rubber.

The moldability and extrudability of *plastic-grade polyethylene* can also be improved by the addition of a few per cent of a low-molecular-weight material.

Other applications where low-molecular-weight polyethylene can be used advantageously include dental waxes, pharmaceutical preparations, paste polishes, cosmetics and pyrotechnics.

For those considering the use of low-molecular-weight polyethylene resins in the manufacture of their products, it would seem to make good sense to seek the advice of someone with a broad line of resins and whose experience and technical facilities enable them to suggest the most economical material and the most efficient formulating procedure possible, for example, Eastman Chemical Products, Inc., Kingsport, Tennessee.

Eastman offers 4 types of low-molecular-weight polyethylene

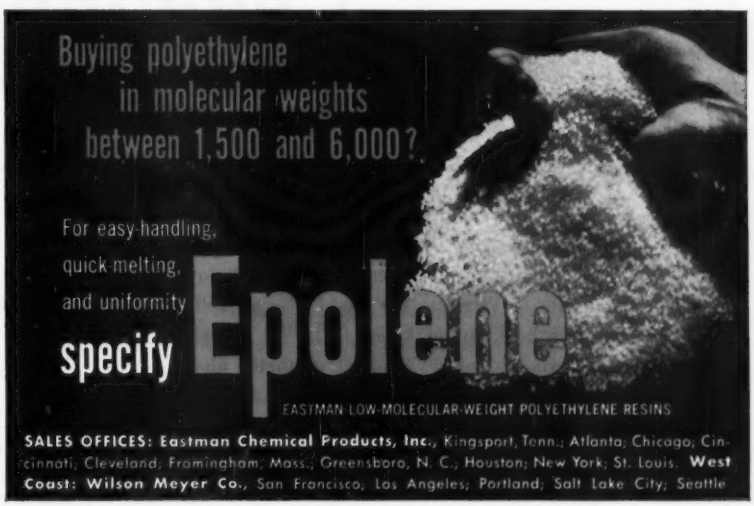
Epolene N—*molecular weight of 2,500 to 3,000, for paste polish formulations and for upgrading paraffin and similar materials.*

Epolene C—*higher in molecular weight, designed particularly for use as a hot melt paper coating and for slush- and cavity-molding.*

Epolene E—*emulsifiable type of resin similar to Epolene N in molecular weight, for preparation of emulsions for polishes, textile finishes and other coatings.*

Epolene LV—*molecular weight of 1,500 to 2,000 for paraffin modification, as an additive in rubber and plastics, and as an ingredient in polishes.*

Epolene resins are supplied in closely controlled viscosity ranges. Because of their uniformity, you can standardize formulas and procedures and produce finished products of constant, predictable quality.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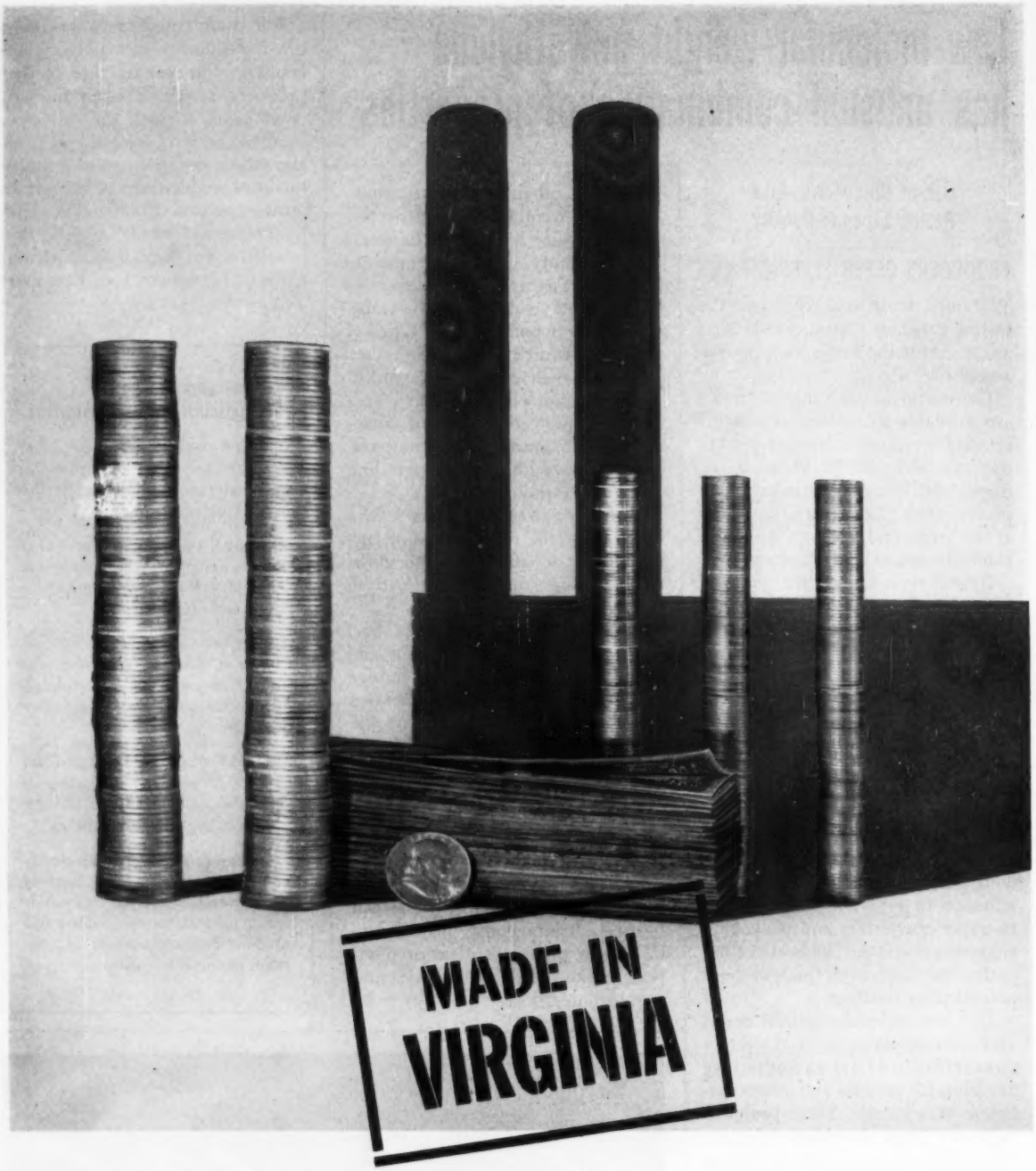

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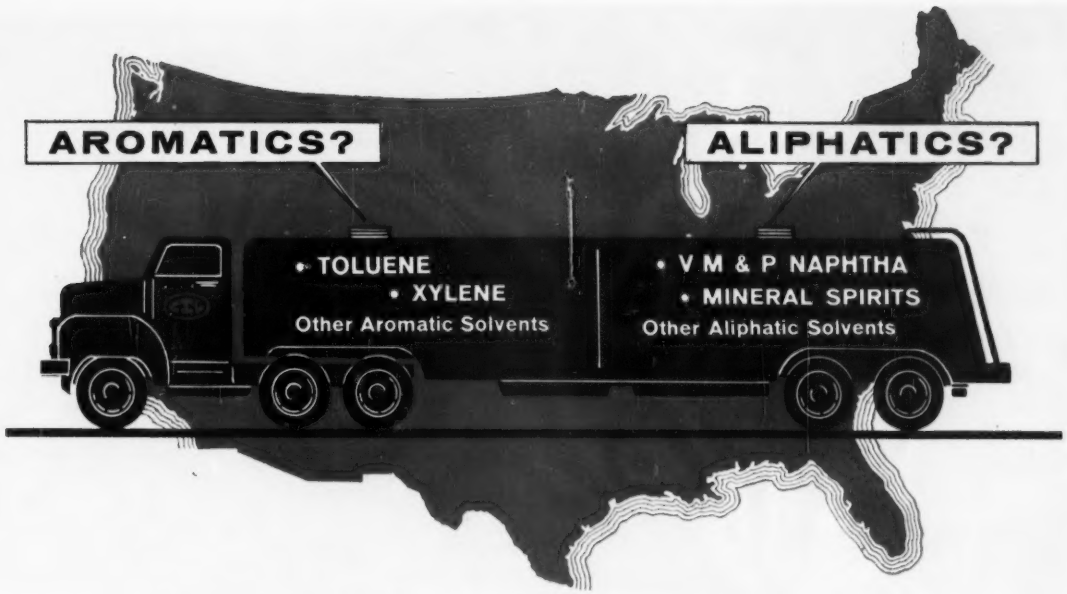

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Chemical Week — May 16, 1959

Proud Record—But Problems Ahead

Despite a proud sales and earnings record (right) and a sunny long-term outlook, the pharmaceutical industry does not have clear sailing ahead.

In the remaining months of this year, it must cope with mounting labor troubles, slipping prices on top prescription items, antitrust investigations, narrowing profit margins and greatly stepped-up internal competition.

Moreover, some pharmaceutical men are fearful that steadily rising government applied-research grants may obscure patent rights when marketable products emerge.

This is not to say the drug boom is over. On the contrary, the industry anticipates a comfortable 10% sales gain this year. Profits are expected to show a comparable increase.

Fringe Fracas: Underscoring the industry's labor problems is a strike involving 2,300 workers at Olin Mathieson's Squibb division plants in Brooklyn, N.Y., and New Brunswick, N.J.

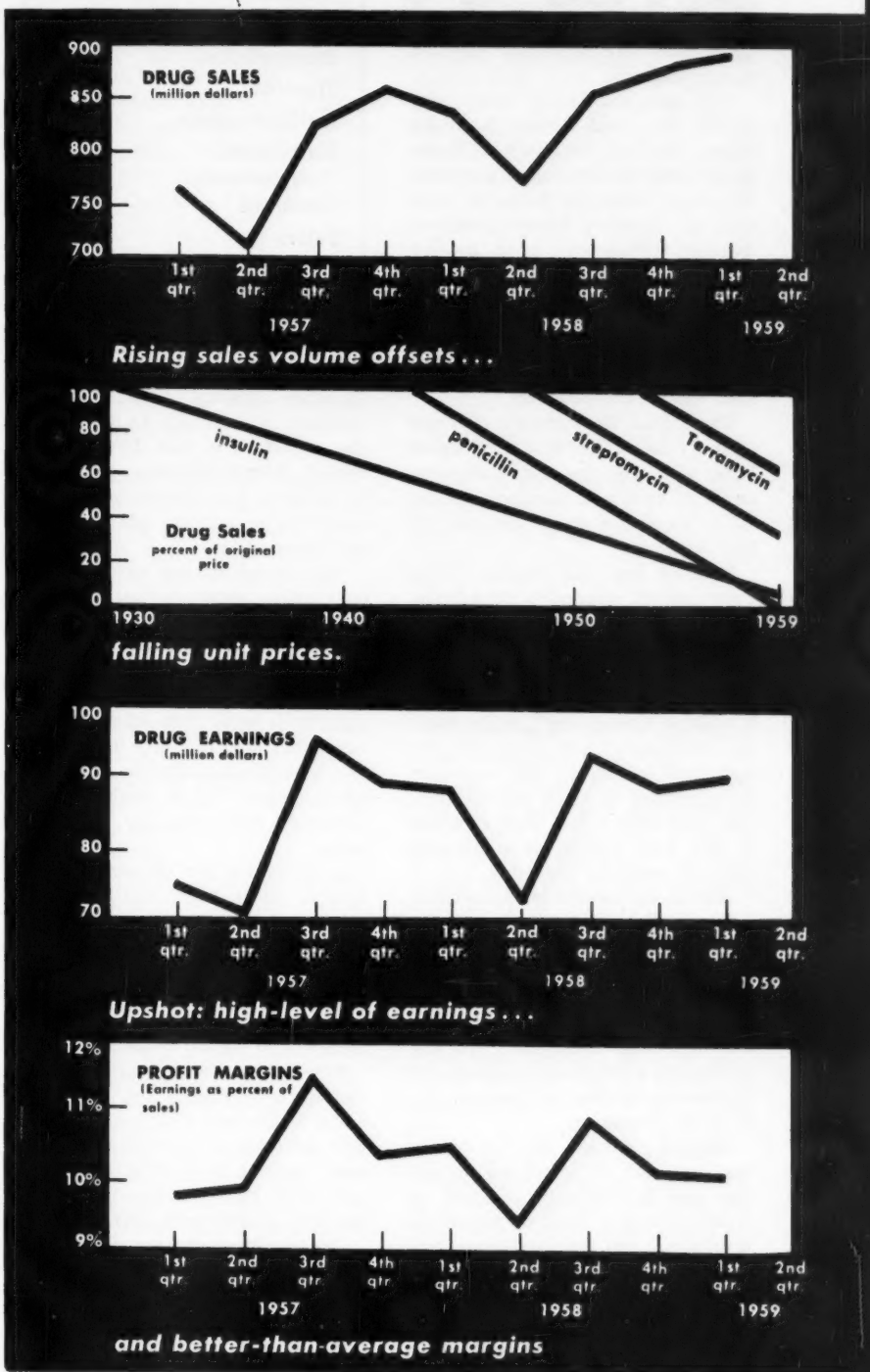
The strike was called last week by the Oil, Chemical and Atomic Workers and, at press time, had not been settled.

Union officials told *CW* that the dispute involved both fringe benefits and wage increases. "An area of agreement was reached on economic issues," said Local President Lester Farine, "but a settlement on fringe benefits has not been reached."

Last week, in addition, wage contracts were renegotiated at Parke, Davis & Co. and the Sharp & Dohme division of Merck & Co. Merck workers settled for a 5% wage hike while P-D signed a three-year agreement calling for increases of 8¢/hour the first year, 7¢/hour the second, and a reopener clause for the third year.

The wage boosts were substantially less than the union had asked, but they can be expected to pinch profits.

Lawyers' Skirmishes: On the antitrust front, the Justice Department's indictment charging illegal price fixing by five polio vaccine makers—Lilly, Allied Laboratories, American Home



Products, Merck, and Parke, Davis—is still being prepared for trial.

At Trenton, N.J., district court Judge Phillip Forman has been conducting pretrial conferences between government and company lawyers.

Since July, when the conferences began, he has been ruling on motions relating to evidence. Object: to shorten the trial itself. More of these conferences are scheduled for this month and next.

Can such indictments affect drug prices? Yes, said Robert A. Bicks, acting chief of the Justice Department's Antitrust Division, in testimony last week before the Kefauver Antitrust & Monopoly Subcommittee on Senator O'Mahoney's price notification bill. Said Bicks: "The price of polio vaccine revealed a marked decline following indictment." Bick's clear implication is that, as a result of the indictment, producers are pricing their vaccine competitively.

The Justice Department's civil suit against Chas. Pfizer & Co., charging Pfizer with acquiring and maintaining an illegal citric acid monopoly, is also still in the pretrial stages. The suit was filed last year.

Rebuttal Set: The Federal Trade Commission's monopoly, price-fixing, and restraint of trade charges against six antibiotics manufacturers—Cyanamid, Bristol-Myers, Bristol Labs, Olin Mathieson, Upjohn, and Pfizer—is midway through the hearing stage; the commission's side of the case was completed in March. The companies are scheduled to begin arguing their side right after Labor Day. Hearings in New York will go on almost continuously until late December.

Also on the horizon for this autumn is Senator Kefauver's hearing on pricing. His subcommittee staff says its promised drug industry price probe is "still very hot." Public hearings, however, probably won't get under way until fall. Staff investigators are now poring over volumes of documents and information subpoenaed from the major drug companies.

Sagging Prices: Another factor that may put the pinch on margins this year is continuing pressure on prices—not as a result of federal investigations, but from stiffening competition. Price weakness has hurt profits on some of the major prescription items (*see table*). Vitamins, vaccines, steroids and the older antibiotics were particularly hard hit.

'58 Prescription Breakdown

Drug	% of Total Prescriptions
Antibiotics	14.7%
Barbiturates	12.5%
Tranquilizers	9.8%
Steroids	9.4%
Antihistamines	9.4%
Nutritional supplements	8.1%
Narcotics	6.4%
Sulfas	4.9%

A strong factor here is rapid product obsolescence—a prime hazard of the drug industry. Case in point: American Cyanamid's Lederle Division reports it is now developing D-methyl chlortetracycline, which will be groomed for markets now dominated by the popular and profitable oral tetracyclines.

And, though steroids were the fastest growing pharmaceutical item last year, Merck, Upjohn, Lederle and Squibb have new steroid entries that will divide existing markets.

Mental Drugs Abound: Tranquilizer capacity is more than adequate. Almost every drug firm now has at least two in volume production. And the relatively new field of antidepressants is already represented by four new drugs.

This race for new products will intensify. The industry will up its research outlay to more than $190 million in '59; it spent about $170 million last year. And, even if the profit squeeze should worsen, drug executives emphasize that research expenditures will be the last to suffer.

Research money, says one company official, is "probably the best-spent dollar in the industry." To keep pace with mounting competition, companies must maintain the flow of new products. More than 370 were introduced last year, slightly more than in '57.

Product Prospects: Among the most noteworthy new products now under development are an oral fungicide that will reportedly eliminate athlete's foot, an oral polio vaccine, several new 'psychic energizers' (antidepressants), and vaccines for the common cold and measles.

A Lederle official reports that more than 550,000 persons have been administered doses of the oral polio vaccine, without adverse effects. Plans call for the vaccine to be given to some 5 million persons in '59.

So far, says Lederle, the tests have been "extremely successful." It's not certain the product will be marketed this year, but there's a chance it may be available by this winter.

A cancer cure is probably the chief research target today.

Major impetus for this quest comes from the government's National Cancer Institute, which has let approximately 100 contracts worth $15.7 million for cancer chemotherapy. The institute did not use its full appropriation, which totaled $18.1 million.

For fiscal '60, the same amount, $18.1 million, has been requested. The House of Representatives has upped this figure by $8 million, part of a $50-million increase for the National Institutes of Health. A substantial part of the cancer research money will go for applied studies by the drug industry.

In all, the government is expected to match the industry's $190-million outlay for medical research in '59. But most drug companies would like to see the program modified.

Instead of spending huge sums for screening drugs and other forms of applied research, industry spokesmen declare, the government should increase its support of sorely needed basic research in medical schools and hospitals.

Ernest A. Volwiler, retired board chairman of Abbott Laboratories, puts it this way: "The government should confine its grants to basic research. When it steps into applied research, it knocks the foundation out from under healthy competition for applied-research activities in the industry."

Wary on Patents: Industry's objection to the NIH grants is also based on fear of a confused patent situation when new drugs are developed.

Under present policy, companies that develop valuable products while working on government anticancer research contracts will be eligible for patents and get first chance at production and distribution. In special cases,

however, the U.S. Surgeon General can license other companies to produce these products.

A check reveals that government officials think the patent arrangements are "satisfactory all around." However, a similar check of industry people elicits scattered doubts.

Similar wariness exists in the antitrust area. Two large pharmaceutical firms tell *CW* they turned down some "comparatively small" government research grants because satisfactory arrangements regarding language of the contract could not be reached. Others point to the Salk vaccine "crash" program—resulting in an antitrust suit against the major companies.

But, the rift between government and industry on this score isn't insurmountable. With reasonable assurances of patent protection, industry men would be satisfied.

And, although the next few months may see a tighter profit situation, the industry is banking on new research finds to lift year-end earnings to near-record levels.

On MCA's Agenda

Chemical company executives and their principal trade association—the Manufacturing Chemists' Assn.—are making plans this week for their annual business-and-golf outing June 11-13 at The Greenbrier, White Sulphur Springs, W. Va.

This will be MCA's 87th annual meeting, and attendance from the 160 member companies is likely to equal last year's 750, an all-time record. On the agenda: address by guest speaker, annual report by MCA President John Hull, election of officers to succeed the incumbent slate headed by Union Carbide Corp.'s Harry McClure, presentation of Lammot du Pont safety awards, and presentation of MCA's '59 college chemistry teaching awards.

Six instructors from large and small colleges throughout the country have been selected for the teaching awards. Named to receive the honors—along with a medal, citation and $1,000 check for each—are James Culbertson, Cornell College (Mount Vernon, Ia.); Louis Frederick Fieser, Harvard (Cambridge, Mass.); Roy Israel Grady, Wooster College (Wooster, O.); Hans Jonassen, Tulane University (New Orleans); Louise Kelley, Goucher College (Baltimore); and Richard Edward Powell, University of California (Berkeley).

Names of the Lammot du Pont safety award winners have not yet been announced; but last week, MCA awarded certificates of achievement to 430 chemical plants that operated throughout 1958 without a single disabling injury. This was a notable increase over last year's performance, when MCA awarded 397 certificates.

Six companies each received 20 or more of this year's plant awards: Du Pont, 79; Allied Chemical, 44; Air Reduction, 35; Stauffer Chemical, 31; American Cyanamid, 24; Monsanto Chemical, 23.

Pickup for Pacific

Pacific Chemical & Fertilizer Co. (Honolulu and San Francisco), which took a beating last year, is eagerly looking forward to better fertilizer business predicted for this year (p. 134).

For Pacific Chemical—which will be 69 years old next week—1958 was "a very trying and unprofitable year," President R. Q. Smith told stockholders at the recent annual meeting in Honolulu. But he added that present conditions "are favorable for profitable operation."

Last year, so many things went wrong for this company that a 14.1% drop in sales was coupled with a net loss of $52,434, compared with the previous year's net profit of $297,344. Aside from the general effects of the nationwide recession, Pacific Chemical was hurt by:

- A strike against sugar and pineapple plantation companies — which normally account for about 68% of Pacific Chemical's sales.
- Pacific Guano — the company's California subsidiary—ran into heavy costs in its program to penetrate the lawn and garden market.
- A management decentralization program was "disastrous from a control standpoint."

Smith told stockholders he has moved a new man—W. L. Dixon, Jr., formerly president of Western States Chemical, a 60%-owned subsidiary—into the post of operating executive at Pacific Guano, and has dropped that company's home and garden line. Also, he said, a strong central management control system is operating.

New Call for Plastics

Plastics producers this week have another sign of their steady advance into markets formerly held exclusively by "natural" materials.

Vulcan Corp. (Cincinnati) — 41-year-old producer of wooden shoe heels and lasts and bowling pins—has launched its first plastics venture: a $250,000 injection molding plant to make plastic heels at Portsmouth, Ohio. After it builds up its plastic heel business, Vulcan plans to use resins to produce other shoe components and to seek custom molding jobs for other products. At the start, it will use about 1 million lbs./year of cellulose acetate from Eastman Chemical and acrylic resin from Rohm & Haas.

Vulcan operates 10 plants in Massachusetts, Missouri, Wisconsin, Michigan, New York and Ohio.

Courted—And Won

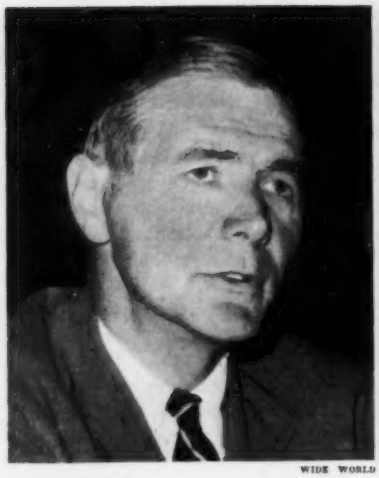
After an 11-month courtship, Dow Chemical Co. has won a new customer for its magnesium hydroxide.

Dow will pipe solutions of the material from its Freeport, Tex., plant to B. J. Lavino Co.'s planned magnesite plant on adjacent ground. With fresh competition on the way in magnesium (*see p. 40*), Lavino will be an especially welcome outlet.

To encourage the Philadelphia-based company, Dow sold it 25 acres of valuable land at Midway (Tex.) at a reasonable price, offered an easement on the river (where a wharf could be built), and gave permission for Lavino to dump its liquid waste into Dow canals.

For Lavino, the deal will mean a big capital outlay saving. Originally, Lavino had planned to construct an $8-million plant on land it expected to buy from Freeport Sulfur, and would have produced its own magnesium hydroxide from sea water. The recession held up these plans, and when it came time to reconsider, Lavino accepted Dow's proposal.

Under the new plans, Lavino will spend only $3 million to put up the plant, "considerably more on step-by-step enlargements in the future." It will ship the magnesite to its refractories plant at Plymouth Meeting, Pa., and to a plant it plans to build in the Chicago area.



WIDE WORLD

WIDE WORLD

Socony's Nickerson, Shell's Burns push deeper into petrochemicals.

New Stress on Oil Chemicals

From Los Angeles last week came word that two of the nation's largest oil companies are laying considerably heavier stress on their chemical operations this year.

• Socony Mobil's wholly owned General Petroleum Corp. is setting up a Petroleum Chemicals Dept. to explore opportunities for new ventures in this field.

• Shell Oil Co. President H. S. M. Burns told Los Angeles security analysts that his company is increasing its capital expenditures this year; the company's new "synthetic natural rubber" (*CW Business Newsletter, March 14*) and its epoxy resins (prices of which were slashed last fall) are expected by the firm to be top sales items in '59.

Still a Newcomer: Compared with some other major oil companies, Socony Mobil is only a freshman in petrochemicals. Its annual report for '55 doesn't mention the subject. But now, President Albert Nickerson makes clear, this company is out to make up for lost time.

In '57, the parent company formed a petrochemical marketing department within its domestic marketing organization. The new unit was and is headed by P. W. Judah, whose title is manager of petroleum chemicals.

Meanwhile, several operating subsidiaries moved into chemical production. By '58, three refineries had been augmented by delayed-coking units; a fourth is about to go onstream at Paulsboro, N.J.; and General Petroleum is starting another one at Torrance, Calif., for completion in first-quarter '60.

Alkylation units went up last year at refineries in Trenton, Mich., and Beaumont, Tex.; and these refineries also got facilities for recovery of liquefied petroleum gas (LPG) from refinery waste gases. Hydrogen sulfide is being recovered at Beaumont, and a new unit at Paulsboro produces sulfur from the refinery gas it recovers.

Biggest single step in Socony's chemical buildup was announced two months ago: a plan to build a 380-million-lbs./year, high-purity ethylene plant at Beaumont (*CW, March 14, p. 25*). This $25-million project—to be operated by 99.9%-owned Magnolia Petroleum Co.—will also produce propylene and butadiene.

And in its foreign operations, too, Socony Mobil is turning to chemicals. Standard-Vacuum Oil Co.—owned 50-50 by Socony Mobil and Standard Oil of New Jersey—last year contracted to build a plant at its refinery near Melbourne, Australia, to produce ethylene and other hydrocarbons for three plants for production of synthetic rubber, polyethylene and polystyrene to be built nearby. More recently, Standard-Vacuum agreed to supply 5 billion cu.ft./year of natural gas as feedstock for a government-owned urea plant to be built on Sumatra, Indonesia.

But, for the moment, interest in Socony Mobil's growing yen for chemical status centers on General Petroleum and its new Petroleum Chemicals Dept. GP—acquired in 1926—is an integrated producer, refiner and marketer of oil products. Its refinery at Torrance has a crude capacity of 125,000 bbls./day, and its new $4.5-million delayed-coking unit will bring GP's coking capacity to 35,000 bbls./day.

To head the new department, GP brought in James Bell, who—up to May 1—was executive vice-president of Northwest Natural Gas Co. (Portland, Ore.). "We've been in petroleum chemicals in a small way up to now," a GP official commented, "but only as an adjunct to our manufacturing. Now we've set up this new department formally to study possibility of other activities in this field."

Also, Socony Mobil's research program is taking on more of a chemical hue. Last year's principal projects included two new catalysts, a gasoline additive to deter carburetor fouling, and "experimental products for advanced-design aircraft." Socony is one of the 10 corporate partners in the Industrial Reactor Laboratories that started operating near Princeton, N.J., last January; and Socony's own nuclear laboratory is to be completed this summer.

Gains in Recession: Shell Chemical—a subsidiary large enough to be reorganized into five substantial divisions (*CW, Dec 20, '58, p. 23*)—lost some ground last year. Sales slipped 10% in tonnage, 7% dollarwise; '58 totals were 935,000 short tons and $187.9 million. But a number of products scored gains despite the recession.

Offtakes of certain solvents—particularly those used in resin and lacquer operations—offset declining sales of other solvents. Insecticide sales were up, reflecting heavy infestations in some areas.

Shell's capital expenditures for chemical plants declined last year to $11.4 million, 30.7% less than in '57 and little more than one-fourth of the $40.5-million payout in '55, the company's peak expansion year. Principal projects under way this year are the acrolein and glycerine units at Norco, La., and a phenol unit at Houston, Tex., all three of which are expected to go into initial operation late this year.

Bullish on Metal, Missiles

Prospects are still good for aluminum and missile companies, investors decided last week.

Their particular favorite: Thiokol Chemical, whose common stock price rocketed a cool 40% on the New York Stock Exchange during a five-day trading period. This came just a couple of weeks after the stock had soared to new highs on the strength of a three-for-one stock split. It may have been inspired by reports that Thiokol might get a contract to develop the propellent for the air-launched ballistic missile (ALBM) that the Pentagon has asked Douglas Aircraft to start designing.

Aluminum stock prices were rising only modestly last week, but this gentle climb was noteworthy because it came immediately after a week of declines. Securities of six major U.S. producers were all caught in the downturn that trimmed their market values an average of 5.6% between April 24 and May 1. The rally started the next trading day.

First-Quarter Dips: The aluminum stock drop appears to have been generated largely by disappointment at first-quarter financial reports. Aluminium Ltd. cut its quarterly cash dividend payments (from 17½¢ to 12½¢/share) after disclosing that sales and earnings fell, the latter by more than 50%; Aluminum Co. of America's net income slid 6.4%, despite a 4.4% sales gain; Kaiser Aluminum & Chemical sales and earnings fell 8% and 45%, respectively; and for Reynolds Metals, first-quarter profits dwindled by 9%, while sales slipped 3.3%.

But after allowing for these comedowns, the financial community began taking stock of more favorable developments.

Alcoa says its sales have been picking up to such an extent that it has reactivated several potlines closed since last fall and is stepping up bauxite and alumina output. Part of the sales pickup, Alcoa concedes, is probably forward-buying on the part of aluminum users who want to bolster their metal inventories. They're preparing for a possible strike this summer, when three-year aluminum union contracts expire.

Nonmilitary Sales Up: Kaiser and Reynolds also are guardedly cheerful, are opening several new potlines. Kaiser says shipments and bookings are up, and last week declared regular quarterly dividends on all common and preferred shares. Reynolds says that while government buying of aluminum has dropped significantly, resulting in a $3.8-million dip in total sales, a year-old upswing in shipments to commercial customers is continuing.

And last week, Reynolds revealed that by restarting units at its plants in Listerhill, Ala., and Jones Mill, Ark., it is lifting current production to roughly 93% of current capacity. President R. S. Reynolds, Jr., said the additional metal is needed to meet market demands for pig and ingot aluminum.

By year-end, Reynolds expects to complete its new reduction plant at Massena, N.Y.; first potline there is slated to go into operation in July. The Massena plant's 100,000-tons capacity will up the company's total capacity to 659,000 tons/year.

Ormet Fully Onstream: Ormet Corp.—owned jointly by Olin Mathieson and Revere Copper & Brass—and its electric power station are now in full operation. Ormet netted a small profit during the first quarter. But Olin Mathieson—committed to buy 66% of Ormet's output—is still losing money on aluminum, largely because its big rolling mill is not completed.

Meanwhile, OM affiliates are proceeding with their ends of the global aluminum venture. Last week, Ormet Ship Finance Corp. sold $17 million in 5⅝%, 20-year, mortgage collateral trust bonds to cover the cost of three new cargo vessels scheduled to be delivered this year. Another ($8 million) cargo ship is to be delivered a year from now to Olin Mathieson Shipping Corp. And OM says construction of the Fria alumina plant and bauxite facilities in Guinea, West Africa, "is proceeding on schedule, and relations with the government of Guinea are excellent."

No Dividend Commitment: As of weekend, there was no confirmation from Washington on the report about a contract on the propellent for the ALBM. And Thiokol management insists it knows of no other event that would explain last week's stock price leap. Merger discussions with Marquardt Aircraft Co. are still termed "very preliminary," and Thiokol directors will not consider dividend action until their fall meeting.

So far, Thiokol has never paid a cash dividend. Investors seem to be satsified with the 5% stock dividends that have been issued each year since 1954. But there was at least ground for new speculation about a possible change in dividend policy: Thiokol disclosed that a provision in a recent financing puts a broad limit on cash dividends—up to 70% of consolidated net earnings after Dec. 31, '58. This limitation also applies to cash acquisitions (except from aggregate net cash proceeds from sale of stock).

New Titanium Tie-up

Mallory-Sharon Metals Corp. may soon acquire a fourth parent, as a result of a deal designed to bolster the former's market position in reactive metals.

Bridgeport Brass Co. has agreed to supply Mallory-Sharon with metallurgical know-how, fabricating facilities, commercial organization, and management resources. In exchange, Bridgeport receives an option to buy enough Mallory-Sharon shares to become an equal partner with present owners, P. R. Mallory and Co., Sharon Steel Corp., and National Distillers and Chemical Corp.

The move will give Mallory-Sharon extruding facilities, will therefore be a vertical-integration step. And it may bolster the company's sagging profits, which slipped into the red-ink column last year.

The deal will deepen Bridgeport's stake in special metals. Although Bridgeport's principal products are copper, brass, bronze and aluminum forms, it is no newcomer to reactive metals, and has been turning out extruded forms and processed tubing in a variety of metals—e.g., zirconium, titanium, and molybdenum. Bridgeport has also processed some uranium, vanadium, tantalum, columbium and hafnium.

Mallory-Sharon's forte is titanium and zirconium. At its Huntsville, Ala., plant, it also makes tungsten and molybdenum. Columbium and tantalum production is in the research stage, the company reports.

COMPANIES

Thiokol Chemical Corp. has won an $11.9-million "continuation contract" for rocket production and plant maintenance at the Longhorn Ordnance Works (Marshall, Tex.) and at Brigham City, Utah, Thiokol's accelerated employment program has prompted it to lease an additional 24,500 sq. ft. of office space, along with 10,000 sq. ft. of additional warehousing. Employment at the center is already more than 1,800.

•

Wade Drug Corp. (Shreveport, La.) has filed a registration statement for 157,250 shares of common stock, which it plans to sell primarily to retail druggists at $10/share. Principal officer and stockholder James Wade, Jr., would receive a commission of $1.50/share. Wade was set up in March '58 to produce ethical and proprietary drugs and to purchase other drug producers. Two months later, it bought the assets of Jim Wade & Co., which produced a foot medicine and other products.

•

T. M. Duche & Sons (New York) has dissolved its subsidiary, Duche Uni-Gum Corp., and will operate it as a division. Duche is a specialty food producer; Uni-Gum makes vegetable colloids.

EXPANSION

Paper: Marathon Southern Corp., a unit of American Can Co., plans a $9-million expansion for its Naheola, Ala., pulp and paper plant. The $40-million plant, which went into operation last year, makes sulfate pulp, envelope and tablet stock, lightweight board, tissues and paper towels.

•

Magnesium: Alabama Metallurgical Corp. plans to start up its 6,800-tons/year Selma, Ala., magnesium plant by Sept. 1, with full-scale production slated to be under way by next Jan. 1. Cost: $4.5 million.

•

Nickel: International Nickel Co. plans to spend $30 million during the rest of this year on its Thompson, Manitoba mine project. The mine is expected to yield 75 million lbs./year. To handle the output, Inco is building an electrolytic nickel refinery at Thompson. Since the project has been under way, Inco has spent more than $60 million on it, in addition to the $20 million it advanced to the Manitoba Hydro-Electric Board for building local power facilities. All of the funds were raised internally.

•

Glass Fiber: Ferro Corp. (Cleveland) plans a $700,000 expansion of its Nashville, Tenn., glass fiber plant, the second expansion approved for the plant this year. And Owens-Corning Fiberglass Corp. is adding four new furnaces at its Anderson, S.C., plant to up capacity 10%. The new units are scheduled to be in operation by year's end.

•

Nuclear Fuels: Vitro Engineering Co. (New York) has been awarded a contract to design and engineer a $3.5-million pilot plant for reprocessing nuclear reactor fuels at the Oak Ridge, Tenn., National Laboratory.

•

Adhesives: Pecora, Inc., has broken ground for a 10,000-sq.ft. industrial adhesives plant at Garland, Tex., near Dallas.

FOREIGN

Polyethylene/Scotland: Union Carbide Ltd. is doubling capacity of the 30-million-lbs./year polyethylene plant it put onstream at Grangemouth early last year. The new unit is due onstream next year.

•

Chemicals/Austria: Reichhold plans to broaden operations of its Austrian subsidiary, Beckacite, investing some $4 million during the next five years. The product line will be increased from paint chemicals to include chemicals for the paper, textile and plastics industries.

•

Polyester Fiber/Northern Ireland: Imperial Chemical Industries has bought a 200-acre site in Northern Ireland to put up a Terylene plant. Construction is due to start in '61, and to be completed in '64. The plant would initially employ 1,150 workers.

•

Tires/Iran: B. F. Goodrich has organized a subsidiary in Iran to build a 130,000-sq.ft. tire and tube plant on a 40-acre site at Teheran. Ownership includes a group of Iranian investors. Goodrich is also putting up plants in Australia and Brazil.

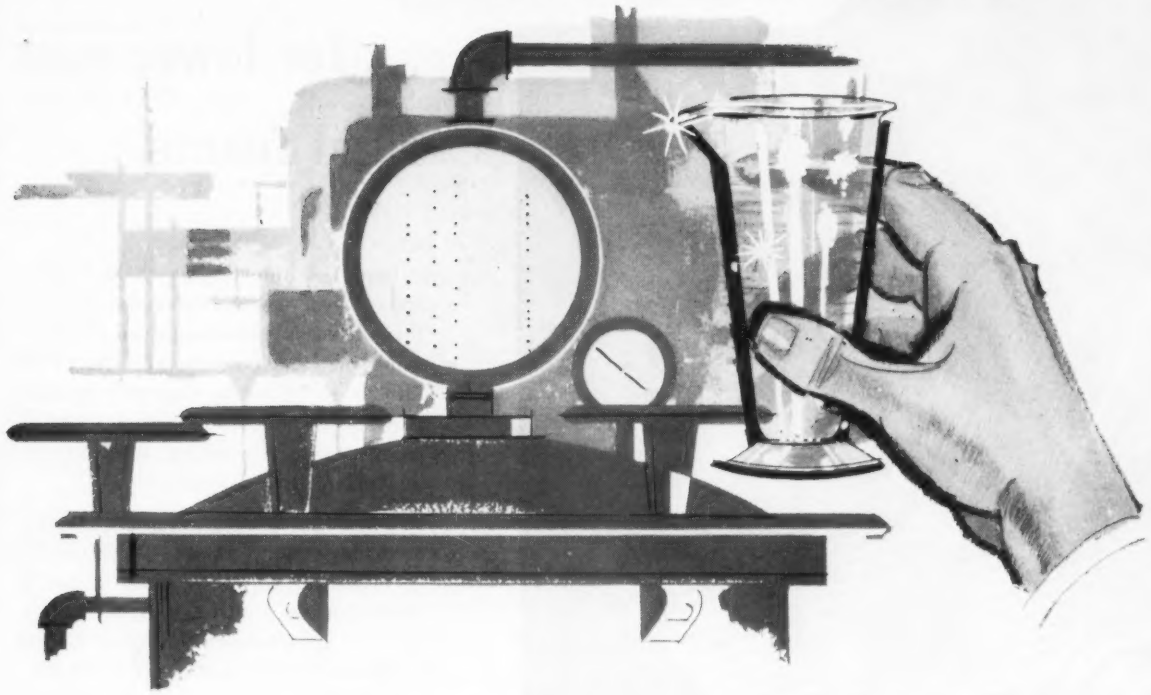
•

Polyethylene/India: Imperial Chemical Industries' subsidiary, Alkali and Chemicals Corp., has just put onstream India's first full-scale polyethylene plant. Capacity: 3,500 tons/year. The entire project, which included building houses, highways and utilities, cost $8.5 million. It will save India about $3 million/year in foreign exchange. Indian polyethylene demand has risen from 100 tons/year in '52 to last year's 2,100 tons.

•

Synthetic Rubber/India: The Indian government is furnishing plans for a 20,000-tons/year synthetic rubber plant. Originally, the plant was to be privately owned, but the government has decided to hold majority ownership in a new company to be set up. Consumers such as Goodyear (which will be technical consultant) and Firestone are expected to buy some shares. The plant is expected to be in full production by '61.

New Standards of Filtration Control



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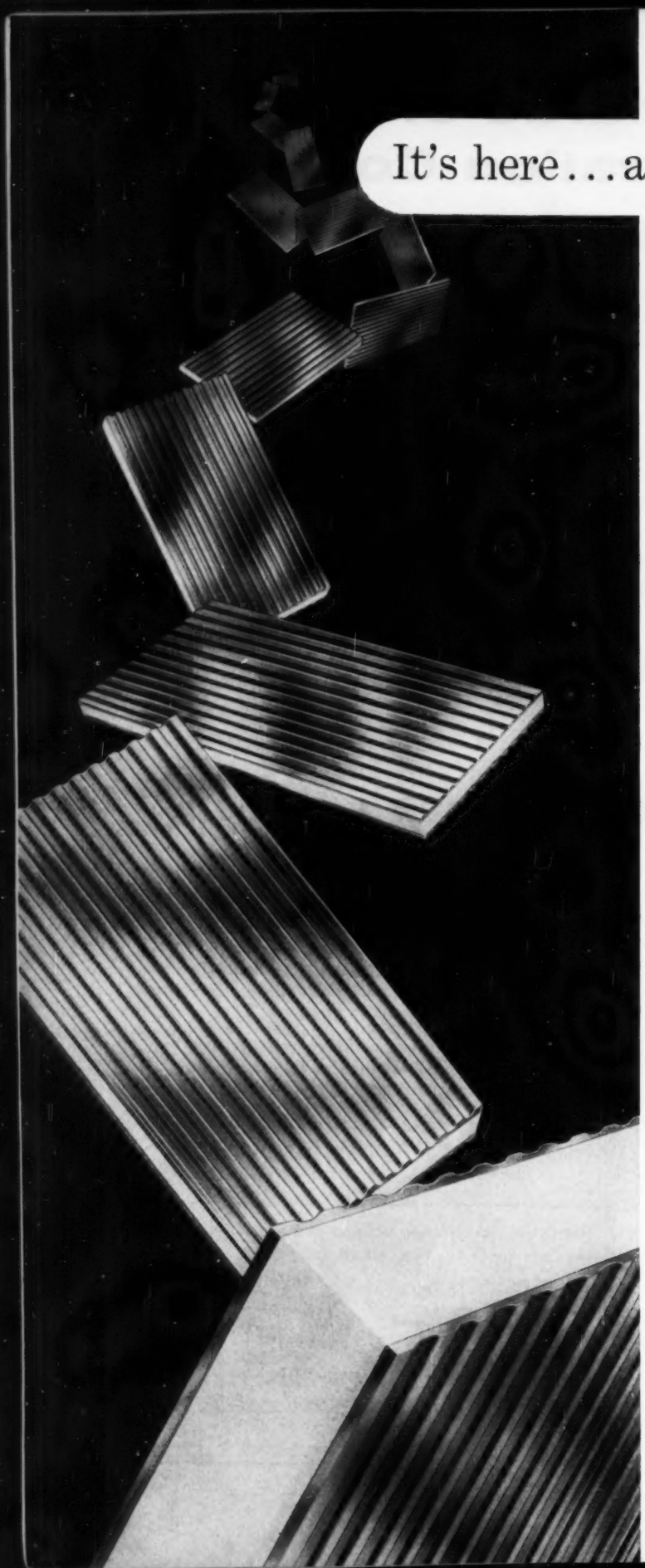

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Improved humid aging characteristics and reduced water absorption for rigid urethane foams are advantages you obtain by using a new CARBIDE polyether—NIAX Triol LK-380. Developed by CARBIDE's research program on urethane intermediates, LK-380 produces a rigid urethane, lower in cost than polyester-based urethanes.

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Triol LK-380, like CARBIDE's other NIAX diols and triols, is made to rigid specifications, offering you custom control of urethane properties. They can help improve your flexible, semi-rigid, or rigid foams, elastomers, coatings, and adhesives. Order by tank car, tank truck, or in 55-gallon drums in carload or LCL lots. Remember, you save money on combination shipments in compartment tank cars and tank wagons.

Get specifications and other technical data on NIAX Triol LK-380 and other NIAX polyols from a Technical Representative in any CARBIDE office. Or write Dept. H, Union Carbide Chemicals Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

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Washington
Newsletter

CHEMICAL WEEK
May 16, 1959

The government is eager to unload surplus commodities and the General Services Administration is seeking ways to dispose of an estimated $4 billion worth of excess materials.

GSA chief Franklin Floete wants to sell about half of the federal stockpile—which now carries an estimated price tag of $8 billion. Floete says he has surplus inventories of 39 items out of the 81 commodities stored in GSA warehouses, hasn't disclosed the amounts of which items he considers "excess."

Commodities to be disposed of include aluminum, asbestos, bauxite, beryl, bismuth, cadmium, castor oil, celestite, chromite, cobalt, copper, graphite, lead, magnesium, manganese, mercury, mica, molybdenum, nickel, quartz, tin, tungsten and zinc. Others, which Floete said already have been earmarked for disposal, include agar, baddeleyite, gem diamonds, platinum group metals, pyrethrum, quinine, and zircons.

All this relates to the furor over disposal of excess copper proposed by the Office of Civil and Defense Mobilization. This move was squelched by a combination of mining-state Congressional opposition and adverse market reaction to reports of the disposal in New York and London. OCDM and GSA are pledged not to unload surpluses in such a way as to disrupt commercial markets; and specific Congressional approval is needed to sell off items in the stockpiles, though not in inventory.

Washington experts guess that sooner or later some of the excess commodities will be unloaded. But it's likely to be a long time off. No one knows how to move them without jiggling market supply and demand.

•

Drug manufacturers have been warned that "sustained release" of "timed release" drug capsules or injections must be approved by the Food & Drug Administration before being marketed. Several untested capsules have been found on store shelves recently; and one shipment of 45,000 capsules, containing amphetamine and barbiturate, were seized from a Philadelphia manufacturer.

The capsules involved, containing such drugs as tranquilizers or vitamin B_{12}, are designed to release the drugs in the blood stream over a calculated period of time from a single capsule or injection. They may be in the form of pellets within pellets, for instance. In the sample seized, the capsules released in two hours instead of 12 when tested in FDA's "artificial stomach." The agency has had no complaints of illness recently but warns that these drugs are potentially dangerous. The law says that if a capsule contains enough drug to be harmful if released all at once, it must be submitted to FDA for pretesting.

•

Amounts of insecticides used on farm produce are being watched carefully by FDA. Fifteen tons of frozen spinach were seized recently

because the spinach contained too high a content of DDT. Part of the shipment was already in the hands of consumers before it was detected, but no cases of injury were reported.

•

Proposals for giving jurisdiction over radiation protection to the U.S. Public Health Service are gaining support. The Atomic Energy Commission's general advisory committee recommends that public health agencies gradually take over regulation of all radiation hazards—industrial or otherwise. Sen. Lister Hill (D., Ala.) has introduced a bill authorizing the shift, and the whole matter will be explored in hearings late this month before the Joint Congressional Committee on Atomic Energy.

•

Government experts expect the steel wage settlement to have the maximum effect on CPI contracts signed afterward. If the steelworkers settle at around 10¢—which is higher than most settlements signed this year so far—look for contracts signed later on to go higher than those signed earlier this year.

If the steel companies are forced to pay more, other union leaders will use this as a lever to fatten their own demands. This is true for the chemical workers, rubber workers, pulp and paper, petroleum, and the like.

Chemical industry increases so far are averaging 8¢, but the range is about 7 to 12¢. About one-third of the settlements are under long-term contracts in the form of deferred wages.

In the paper industry, the average is 5 to 6¢; textiles, about 7¢; petroleum, at 13¢; construction, a traditional leader, as high as 14¢.

Rubber workers, still on strike as *CW* went to press, were trying to get only fringe benefits—vacations, holidays, etc.

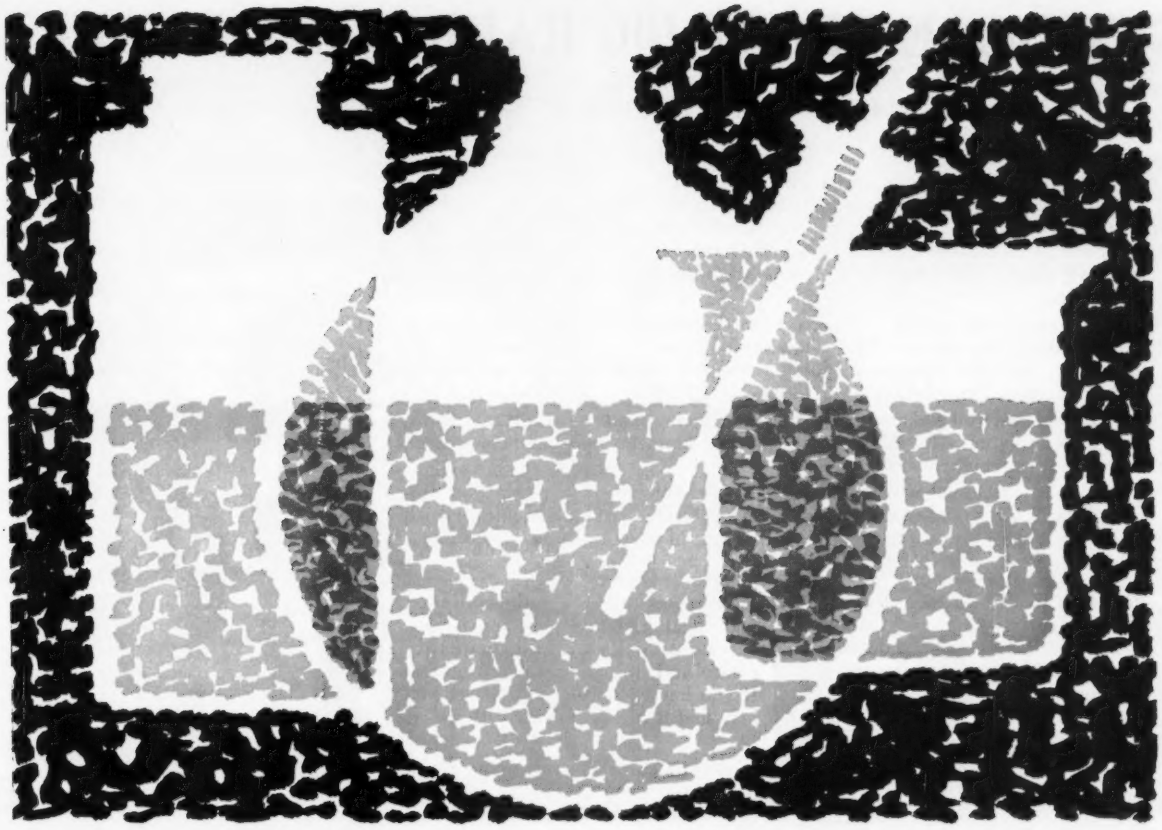
Aircraft companies have signed with the auto workers and the machinists for increases at the low end—5 to 7¢.

•

Import of Soviet school laboratory equipment has domestic producers worried, and the Senate is expected to schedule hearings soon. Sen. Styles Bridges (R., N.H.) complains that the Soviets are dumping some "amazingly good" microscopes, beakers, etc., on the U.S. market at one-fifth the price of comparable domestic goods, despite a 42% tariff. Bridges raises the question of possible deliberate cost-cutting to undermine U.S. markets.

•

President Eisenhower's selection of Earl Kintner to fill out the unexpired term of John W. Gwynne as chairman of the Federal Trade Commission puts an old hand into a new job. Kintner, a Republican, and an FTC lawyer since 1948, has been general counsel for the commission since 1953. He will finish out Gwynne's term, which expires in Sept. '60. Eisenhower will name a new chairman before June 1, when Gwynne's resignation becomes effective. Either Edward T. Tait or Sigurd Anderson, already members of the commission, will get that job.



GET HELP WITH RESINS

from Neville's Technical Service Department

If you manufacture products in the rubber, mastic floor tile, paint and varnish, adhesives or paper industries, to name a few, the chances are you use coumarone-indene or petroleum resins in at least some of your formulae. As a leading source for these resins for many years, Neville continuously develops new variations to match ever-expanding applications. If you have been using the same resin types in your formulae over a period of years, are you sure you are still getting the highest quality results for the lowest cost? Why not let Neville's Technical Service Department help you satisfy yourself? There will be no obligation or breach of confidence . . . only a letter or a phone call is necessary.

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CHOOSE FROM 100 RARE EARTH SALTS

One of them may offer you unexpected and profitable advantages

a report by LINDSAY

The unique properties, intriguing characteristics and amazing versatility of the rare earths suggest the possibility of their usefulness to you. It's not unlikely when you consider that rare earth salts are being used today in production processes involving glass, metals, ceramics, chemicals, fabrics, paint and pharmaceuticals, just to name a few.

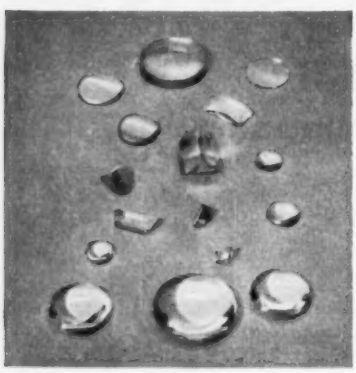
Even today, some manufacturers have not investigated the rare earths because they still think they are *rare*. That is not so. Only a few years ago, the rare earths were little more than laboratory oddities, except of course for a few well-known basic and critically important applications.

It will interest you to know that we are producing more than 100 rare earth, yttrium and thorium salts. We can make prompt shipments in commercial quantities. And at extremely favorable prices.

If you are concerned with research, product development or production processes, it will be significant to you that there has been a vast change in rare earth production during the past ten years . . . in volume, in varieties, in purities of materials commercially available, and in prices.

This is the result primarily of two factors. The curiosity and imagination of research workers who have developed many practical applications. And our own enormously expanded production, particularly of rare earths in high purities up to 99.99%.

Look with us for a moment at some of the interesting developments.



Glass polishing with cerium oxide is one of the most extensive rare earth applications. Lindsay, nearly 20 years ago, revolutionized glass polishing practices in this country when it introduced cerium oxide. Today it is used for polishing millions of spectacles, lenses for cameras and other high precision optical instruments, TV picture tubes, fine quality mirrors, automobile windshields and many glass specialties.

We are operating a fully equipped and capably staffed polishing laboratory continually working on quality control and evaluation of new formulas. If you have a polishing problem, you may find it fruitful to talk with us.

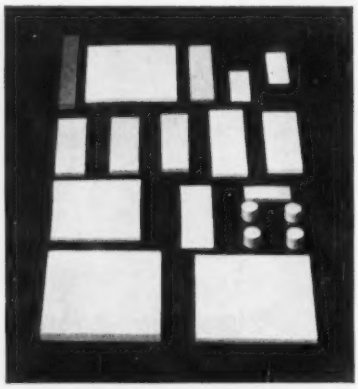
Rare earth garnets for electronic equipment are structurally somewhat similar to the garnet variety grossularite (formula $Ca_3Al_2(SiO_4)_3$). The most interesting ones are the rare earth-iron garnets such as $Y_3Fe_2(FeO_4)_3$. This mouthful of formula has been abbreviated by researchers to "YIG" for obvious reasons. Other names stem from other rare-earth symbols. These garnets, particularly those of yttrium, gadolinium, erbium, and some others have interesting ferrimagnetic properties, making them useful as ferrite materials in electronic equipment.

We don't make the garnets but we can supply the correct material for this particular application, and, of course, helpful technical service.

Neutron absorbing rare earths are now available in ample quantities and at reasonable costs for use as poisons in nuclear reactors. Europium is the most effective control rod material but is relatively scarce and expensive. Control rod designers are making progress in demonstrating the desirable performance characteristics of gadolinium, dysprosium, samarium and erbium.

We would be happy to supply to qualified persons information about significant developments in this field.

Sintered shapes. Through our laboratory research, we have developed a process for producing rare earth oxides in sintered shapes. This information is



now available to you if your experimental work indicates this a desirable form of the rare earth oxides.

Rare earth and yttrium metals are now available from Lindsay. Many users of rare earths prefer them in this form. Our high purity rare earth metals are furnished primarily in the form of ingots or lumps. They are available for prompt shipment from our inventory in experimental quantities.

You will find costs reasonable and advantageous for your research or product development and production operations. Want more information?

This report indicates a wide range of commercial interest in the rare earths. Certainly they have a quite remarkable flexibility and versatility in their application to many uses.

We can't tell you how to use the rare earths in your processes. But we can offer you technical data which may be of interest to your research people.

Please tell us your area of potential interest and we'll try to supply information which is most helpful to you.

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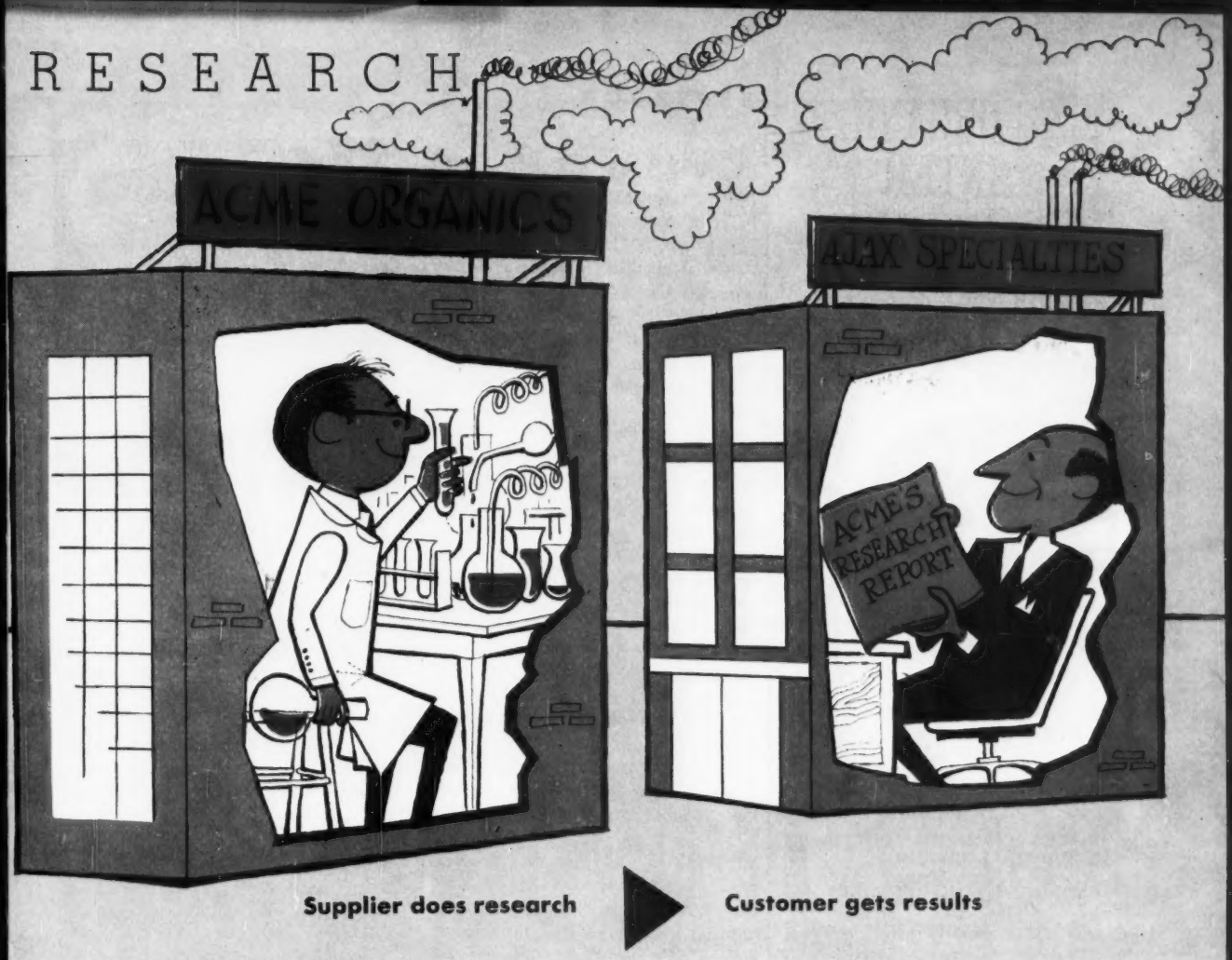

Supplier Research Spells Customer Gains

Large chemical companies have recently noted a significant trend — they are doing more research for smaller, customer-companies. The small firms have been quick to take advantage of suppliers' willingness to help create and improve products— and suppliers now find they must continually give more aid, not only to find new markets but also to keep old ones.

There is a big difference, a *CW* survey pointed up last week, between the long-practiced technical service, and this new customer research. Technical service is intended to assure that users are satisfied with purchases; the research is aimed at finding new ways in which regular buyers can use supplies. Most large companies do service work readily, but the handling of research varies widely — from invitational to doing it under pressure.

Customer Comments: Most of the small concerns are pleased with the new trend. One large Western paintmaker says, "The basic idea of having suppliers do research for you is to produce ideas. Their work usually ends up as money-savers — in fact, we save close to $100,000/year because of research our suppliers do."

Although some suppliers say they object to these research projects, the majority of them solicit the work. Result: many customers don't hesitate to present research problems to the supplier, do not feel guilty of forcing him into it.

Customers and suppliers agree, however, that there is a pretty clear limit to the type of work done. Suppliers are doing little basic research; customers say they prefer to do their own — "to keep our trade secrets to ourselves."

Another aspect that shows customer-companies are not all enthusiastic about letting others do their work: "While many companies receive help from suppliers, most will not admit it," says a Midwest company. "Either they don't want others to know of their own inadequate research departments or they want to assure absolute secrecy about new and upcoming products." Also, many companies are simply reluctant to let someone else do their research for nothing.

Suppliers Speak: Suppliers, generally, are happy to help customers and prospective customers find new products. One firm puts it this way: "It's a necessary program to maintain present business, seek new orders. If we don't do it, our competitors will—and lure away our business."

Some suppliers (the minority) are

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indignant, however, about doing customers' research, feel they have been pushed into this situation (by competition, customers) without any desire to do it. They claim that customer demands are often "entirely unreasonable."

One of the major refractory producers allots an estimated 15% of its research budget to providing free research for customers. The firm depends on its sales engineer to spot problems at customers' plants that might be solved — looks for this practice to result in considerable business. This company approaches the customer with an offer to solve a problem. It adds, however, "This doesn't mean we turn down unsolicited research requests. We may take them, reluctantly, because we aren't geared to take much more work than we solicit ourselves."

Some suppliers' customers that benefit from research done for them must also do work for their own customers. The same paint company that claims $100,000/year savings from research done for it tells *CW*, "We spend about $750,000 each year on research—and 45-50% of this on problems posed by our customers. The customers don't share the expense, are usually not too demanding. But they do have a right to expect you to come through for them. That's competition. When we respond, they do, too—with new business."

The only type of chemical company that has virtually no customer-supplier research interplay is the subsidiary or affiliate of a larger firm. One oil company in the Chicago area told *CW*: "We use the parent company's research facilities if our own are not sufficient."

Whose Rights? Suppliers are cautious on the rights arising out of customer research. Most sign some sort of agreement — usually allowing any patent to go to the supplier, since he spent the time and money, did the research. Formulation rights, application methods, etc., may go to the customer. Or, the customer may bargain for time (e.g., an exclusive license for a limited period) to give him a competitive edge.

Cooperative research is another mutually profitable practice engaged in. For example, the general manager of a small rubber company's plastic division says, "We are quite happy

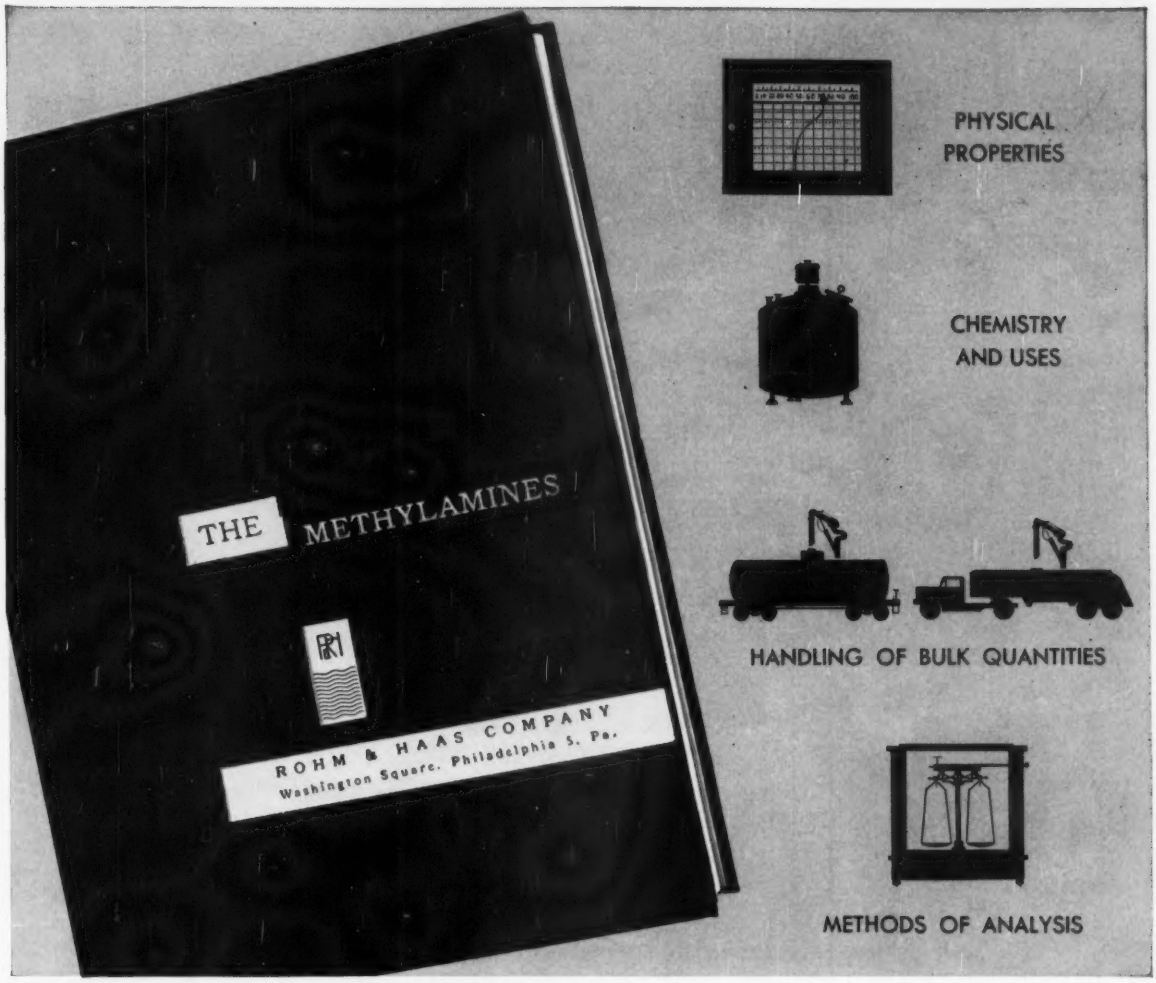
Customer, on co-op research: 'We get a preview on new products; suppliers get free plant-scale runs.'

to work closely with large chemical companies in their development of new resins. The resin supplier often comes to us first, asks for use of plant equipment to make full-scale plant runs. It saves him the time and money of setting up a pilot plant. And we have a chance to influence the supplier's development personnel concerning qualities we need for our new products. At the same time, we get a good look at new materials before they are put on the general market."

Kinds of Research: Of course, the nature of research projects for customers varies widely. One company not only solicits such help from its suppliers but also performs research for its customers. Recently, one of its customers—an aircraft maker—needed help in finding a sealant for units used to make bell-shaped plastic domes. The domes had been cured at 250-275 C under vacuum protected by the sealant—but when the plastic material was changed (polyester to epoxies) a curing temperature of 350 F was required,—and a better sealant. The paint company developed one that would not harden, crack, or break at the higher temperature.

On the other hand, this firm expects help from its suppliers and considers lack of cooperation cause for cutting them off. Textile dyers and finishers are often particularly dependent on outside help.

It's apparent that the economy as now constituted will demand increased research efforts by chemical suppliers, if they are to maintain continued growth of sales, stave off competition.



What you should know about Methylamines ... from a basic producer with 25 years' experience

Rohm & Haas first began production of methylamines in 1934. Today, with a basic raw material position in methanol and ammonia, Rohm & Haas offers you aqueous and anhydrous mono-, di-, and trimethylamines in drums, cylinders, or tankcars—available in dependable, large-volume quantities from two separately located plants.

Because of their low equivalent weight, Rohm & Haas methylamines offer more amino nitrogen per pound than comparable aliphatic amines. If you are interested in rubber accelerators, herbicides, photographic developers, surfactants or pharmaceuticals, you should have "The Methylamines" an 86-page book which contains complete data on chemical reactions and uses, as well as transportation and storage. Write for a copy on your company letterhead to Dept. SP-27.

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METHYLAMINES

Sometimes it's better to let Eastman make it

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Ethylene-propylene copolymer tires draw viewers to Milan fair.

Showcase for C 23 Rubber

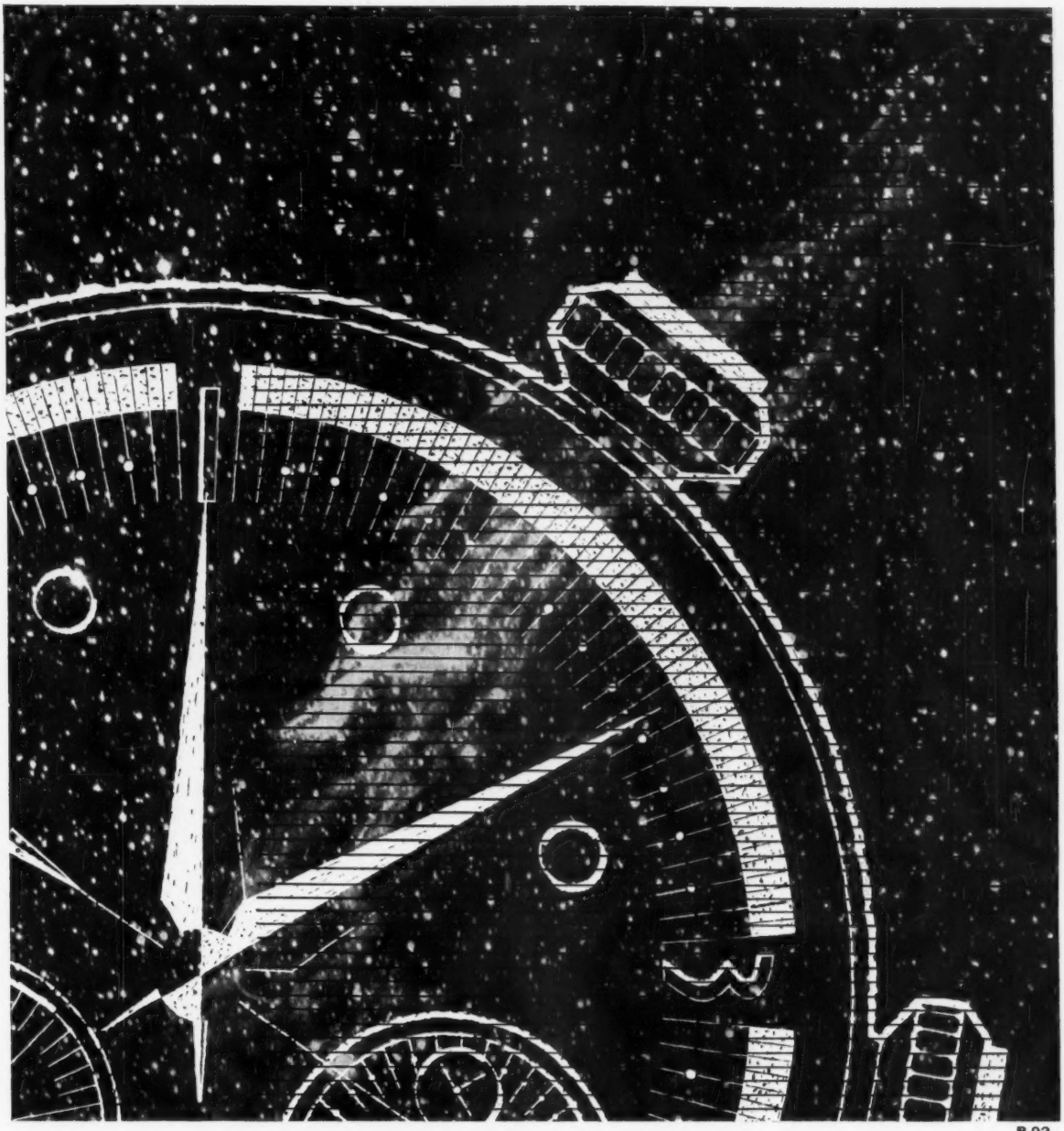
Montecatini last week added some new evidence to its sales case for its new ethylene-propylene copolymer, C 23. A report, now available to tire makers and industrial rubber processors, compares in detail the properties of the still-experimental synthetic with those of conventional elastomers.

Here are some of the high spots of the report on the new compound, which was a hit at the recent Milan trade fair (*CW, May 2, p. 24*). C 23 has elastomer properties approaching those of natural rubber and, in some respects, better than those of conventional synthetics. Rebound at 20 C is 75% (Luepke pendulum) and its minimum is reached at —35 C. Brittle point (temperature) is appreciably below natural rubber's. Low specific gravity (0.85 — 0.86 g/cm^3) offers the possibility of lowering the cost of articles on a volume basis. Thermal behavior and electrical insulating characteristics are also good.

Mechanical properties of ethylene-propylene vulcanizates are generally intermediate between natural rubber and styrene-butadiene copolymers. Elongation at break, for example, is 450-500%, compared with 550-600% for natural rubber and 400-450% for styrene-butadiene. In this respect, C 23 can be classified as a general-purpose elastomer, Montecatini believes. But the new rubber also features resistance to heat, oxygen, oxone, etc.; hence, it may qualify for special applications.

Despite the saturated nature of C 23, which accounts for this inertness, the newcomer is no more resistant to swelling in organic solvents than are the common unsaturated rubbers. It appreciably lags neoprene, nitrile rubber and Du Pont's Hypalon (chlorosulfonated polyethylene) in resistance to aliphatic solvents. None of the rubbers tested showed exceptional resistance to aromatic solvents. But acids and alkalis, Montecatini finds, are easily fended off by C 23.

Currently, C 23 is being produced in undisclosed amounts in a pilot plant at Ferrara, Italy. The linear, amorphous newcomer is still under development but is expected to become commercial soon.



B-92

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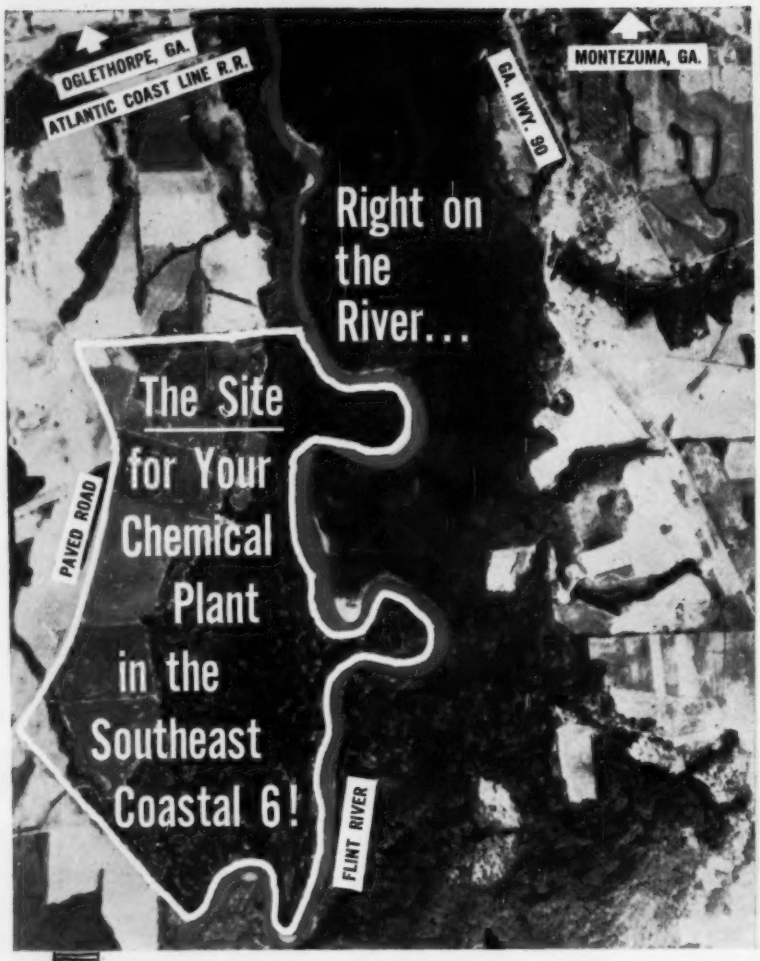
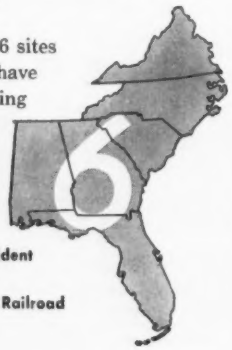


Need water for that new chemical plant? Then look to this 380-acre Flint River site near Montezuma and Oglethorpe, Georgia — right in the heart of the prospering Southeast Coastal 6!

An average of nearly 2½ billion gallons of water flow past each day. Almost 80,000 people live within a 25-mile radius —1500 readily available for industrial employment. Ample power; close-by natural resources; fast freight service by Atlantic Coast Line, linking railroads, or over nearby highways — these are only a few of the advantages that make this *the site* for your chemical plant in the six fast growing southeastern coastal states.

For details on this or other Coastal 6 sites write, wire or phone today. You'll have the information you want in "nothing flat!" All inquiries kept confidential.



ATLANTIC COAST LINE RAILROAD

R. P. JOBB
Assistant Vice-President
Department K-59
Atlantic Coast Line Railroad
Wilmington, N. C.

RESEARCH

PRODUCTS

Gas-in-Metals Standard: The National Bureau of Standards has a series of eight bars of ferrous materials whose oxygen and nitrogen content have been precisely determined—for use as industrial standards in calibrating analytical equipment. They can be purchased from the Standard Sample Clerk, NBS, Washington 25, D.C. Cost: $10 each.

•

TB Drug: The latest entry of Purdue Frederick Co. (New York) is Pheny-Pas-Tebamin (*p*-aminosalicylic phenyl ester) a drug designed for the control of pulmonary tuberculosis. Taken orally, it reportedly produces no gastrointestinal irritation, nausea or vomiting.

•

More Tritium: The Atomic Energy Commission is making 1 million curies of tritium gas available for civilian use at $2/curie including packaging and handling charge. Tritium with a half-life of 12.46 years decays to helium-3 and in the process emits low-energy beta particles, with no associated gamma radiation. It's available from the Oak Ridge National Laboratory.

•

Mercury Antidote: Aldrich Chemical Co., Inc., (Milwaukee, Wis.) now offers N-acetyl-D, L-penicillamine. The compound is reportedly an antidote for mercury poisoning.

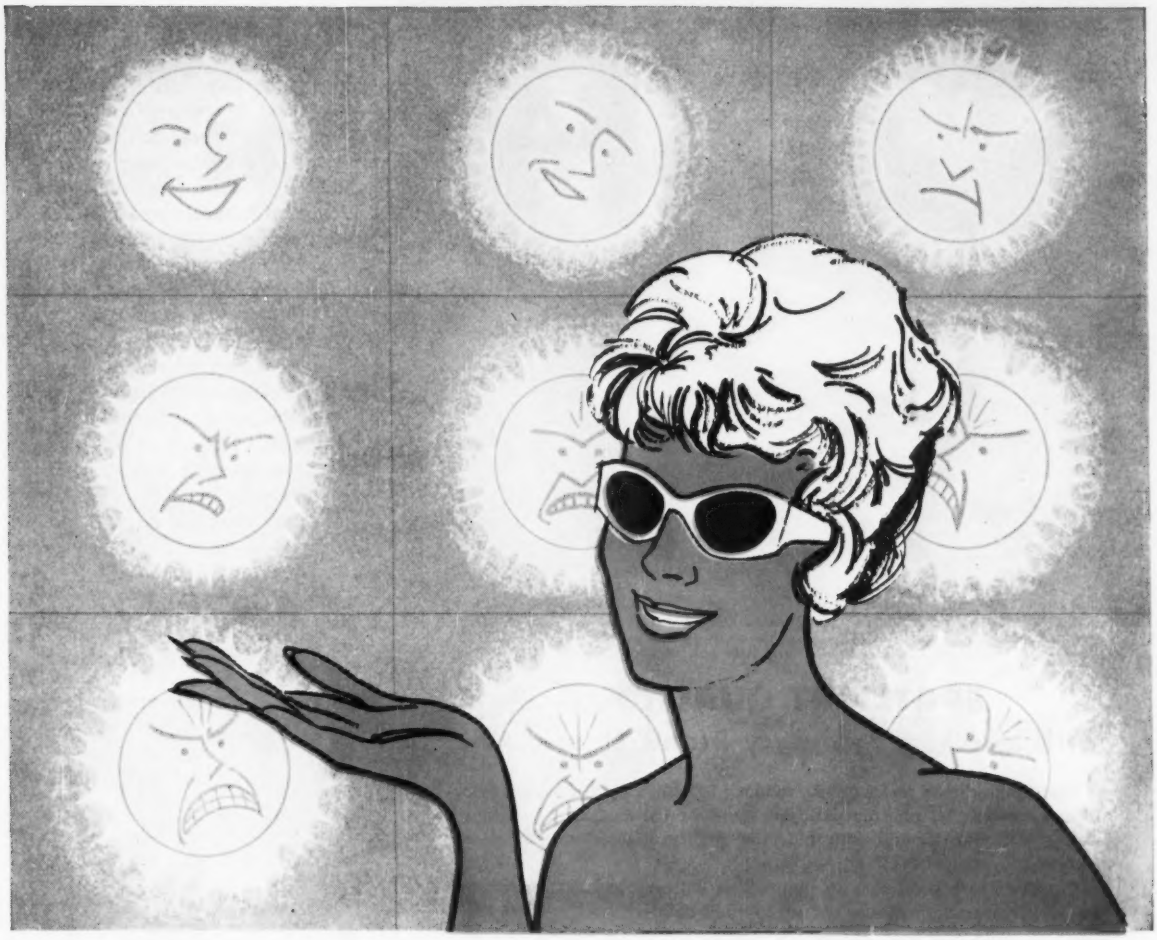
•

New Emulsifiers: General Mills Research Laboratories (Minneapolis) now offers research quantities of new amino - acid - fatty - acid emulsifiers. Most of the products are solid salts. Emulsification and surface tension may be varied, depending on the chain length of the fatty acid constituent. Suggested use is in pharmaceutical and related products.

EXPANSION

• A new chemical and chemical engineering consultant firm, Cox and Gillespie (5 North Sixth St., Richmond, Va.) offers services to the chemical, pharmaceutical and agricultural fields.

• Du Pont (Wilmington) will build a $6-million research laboratory for its Elastomer Chemicals Dept., at the experimental station there. Estimated



A humectant that combats sun-dried skin

Sun-bathers get soothing skin protection from the humectant action of glycerine in suntan preparations. It helps prevent sun-dried skin—moistens, softens and maintains fluidity in sprays, lotions and creams.

Glycerine offers unmatched advantages for toilet goods and pharmaceuticals. It is exceptionally safe, compatible and acceptable. It controls body and consistency, lubricates, prevents settling, resists hardening and prolongs product life.

Important too, glycerine is stable in price, dependable in supply. Our 18-page booklet, "Glycerine Properties and Uses," may suggest new areas of usefulness to you. For a free copy, address your request to the Glycerine Producers' Association.

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ADVANTAGES THAT COME WITH . . .

Glycerine

Applications

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completion date: late summer '60.

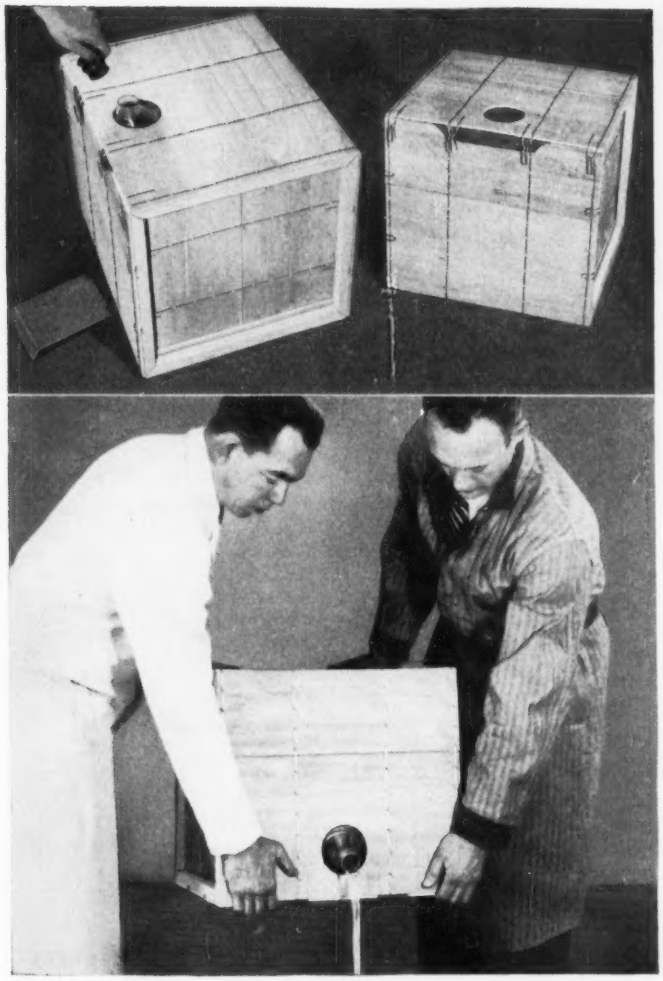
- Food Machinery and Chemical Corp. (New York) has started construction of a new wing designed to add 50% more lab space to its Central Chemical research lab at Princeton, N.J. The Inorganic Chemicals Research and Development Dept. will be housed there. Cost: $1 million.
- Mallory-Sharon Metals Corp. (Niles, O.) has formed a sponsored research group to handle research and development projects on special metals for the government.
- Stein, Hall & Co. Inc. has expanded research and development facilities at its Long Island City, New York, laboratories. New work will be done on paper gumming, coating and laminating.
- Chemstrand Corp. will build a new nylon development center at

UPI

Crystal Growth Twist

Technician J. J. Coleman is watching a ribbonlike crystal of germanium rise from a molten pool in a new crystal-growing furnace at Westinghouse Research Laboratories. The novel technique of producing germanium will get further development under a $2-million contract recently awarded Westinghouse by the Air Force. It's hoped that by growing the crystals as thin, uniform flat ribbons, the current practice of slicing and polishing segments from bar stock (about ½-in. diameter) may be eliminated, lead to lower cost and wider use of semiconductor devices.

Now — A "One Trip" Container For 15 Gallons That Is



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Wirebound Cubitainer®

for most bulk liquids

Any liquid safe in polyethylene (including regulated products) can be handled, shipped and stored in the new 15 gallon WIREBOUND CUBITAINER. This expendable package — which meets industry and government standards for **safe** handling and shipping — consists of an unbreakable semi-rigid molded polyethylene insert, cushioned on six sides by corrugated material (including a handy pull-out flap), and nestled in a strong, lightweight wirebound wooden container.

The WIREBOUND CUBITAINER costs approximately 80% less than a 13 gal. glass carboy pack, and offers over 80% savings in tare weight. Its cubical shape requires less than half the usual storage space, and allows efficient palletizing.

The wirebound construction provides natural handholds at both ends, withstands over 10,000 lbs. of stacking pressure **wet or dry** (making outdoor storage possible) and keeps the contents safe during severe rough handling.

For more information on WIREBOUND CUBITAINERS, write, wire or phone

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RESEARCH
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Rockaway, New Jersey

CUBITAINER is the registered trademark of Hedwin Corporation, Baltimore 11, Maryland.

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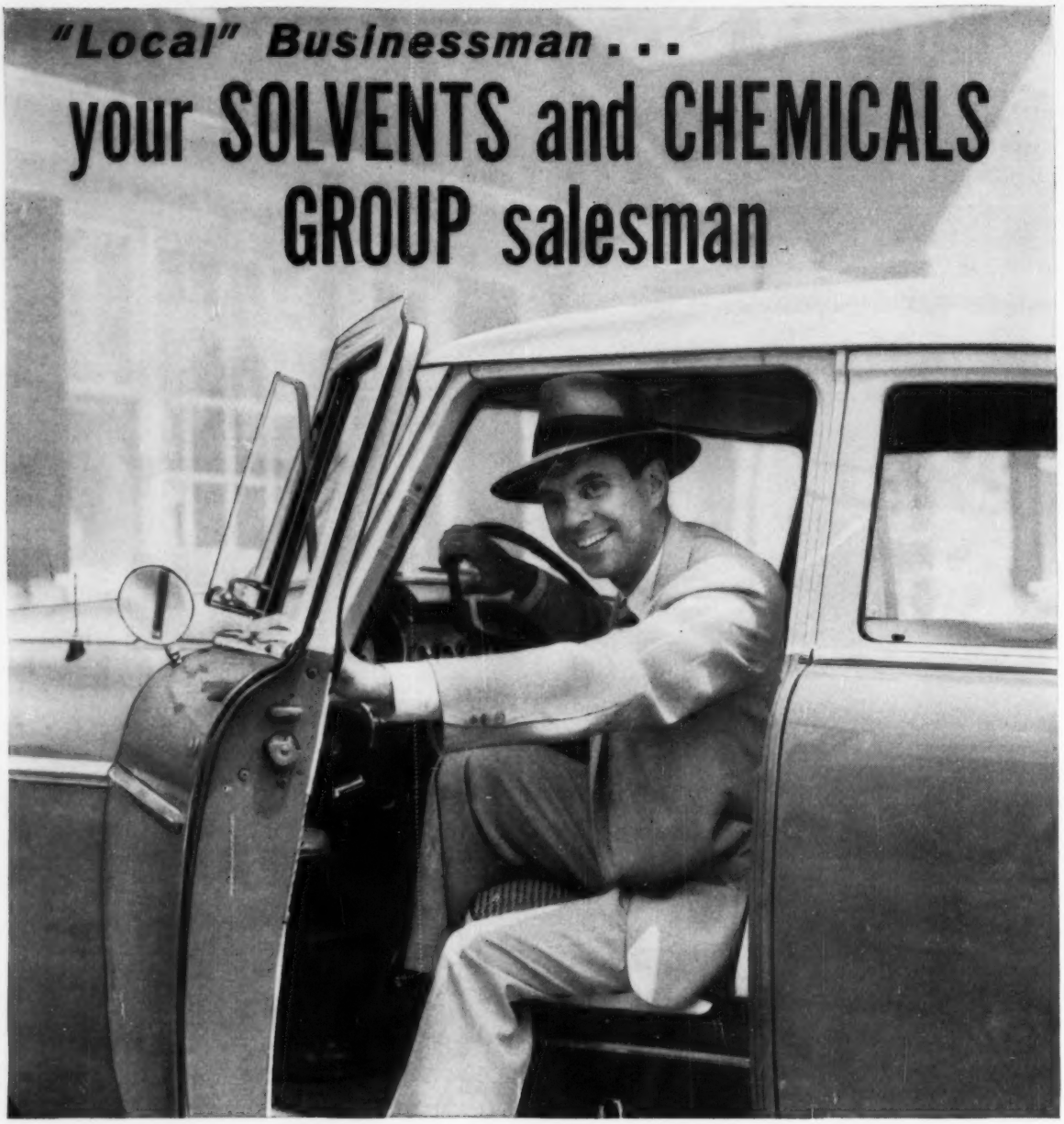
your SOLVENTS and CHEMICALS GROUP salesman



Although he's an extremely important man in an organization embracing 17 plants throughout the country, your Solvents and Chemicals Group salesman is an established local businessman. His home phone number is on his card—you can count on his help in any emergency. Highly trained, with a thorough understanding of his products' end-use, he has a genuine, friendly interest in your problems . . . gets his products to you—quickly! For "Just around the corner" service and a single source of supply for high-quality products from the nation's leading producers, see this man when he calls . . . **your Solvents and Chemicals Group salesman is a good man to know.** ——→

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RESEARCH

Pensacola, Fla. When finished, in '60, the lab will house 150 scientists and technicians.

• Foster D. Snell Inc. (New York) has changed the name of its subsidiary Crippen & Erlich Laboratories Inc. to Crippen Laboratories Inc.

• Morningstar Research Center Inc. (Milford, Pa.) is a new consultant organization in the textile sizing and related chemical fields.

• Airkem Corp. (New York) has opened new laboratories in New York, including facilities for testing odor reaction.

• Hess & Clark, Inc., a subsidiary of Vick Chemical Co. (New York), has contracted for the construction of a poultry nutrition research center in Ashland, O.

• Du Pont Co. (United Kingdom) Ltd. this week opened its Elastomers Research Laboratory at Hemel Hempstead, nearby London. The lab will service the firm's soon-to-be-completed Londonderry, Northern Ireland, neoprene plant and provide technical assistance to European and African rubber makers.

APPARATUS

Color Matcher: A new spinner-type sample holder makes it possible to measure the reflectance of colored samples of fabric (e.g., corduroy) having directional weave. It is used with the Color-Eye optical colorimeter manufactured by Instrument Development Laboratories, Inc. (Attleboro, Mass.), a subsidiary of Royal McBee Corp.

•

Microscope Line: D. P. Bushnell & Co., Inc. (Pasadena, Calif.), is offering a new line of 15 microscopes priced $24.50 to $295.

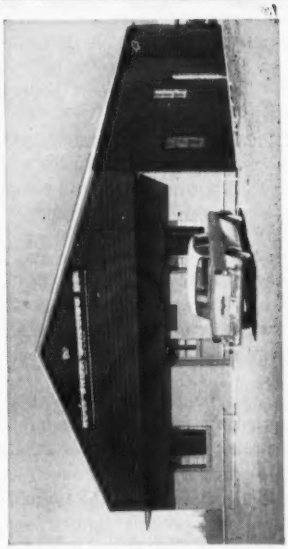
LITERATURE

• The Mast Development Co., Inc. (Davenport, Iowa) offers a free circular describing research services available to the CPI.

• "Accessories for Microscopy" is available (free) from Ernest F. Fullam, Inc. (P.O. Box 444, Schenectady, N.Y.).

• After July 1, the "Journal of Research" of the National Bureau of Standards (Washington 25, D.C.) will be published in four parts. Section A, Physics and Chemistry, will be issued six times a year. Cost: $4/year.

STRAN-STEEL BUILDINGS—NOW IN COLORS!



These three Rigid Frame structures, illustrated in Stran-Satin Blue, combine office quarters with column-free shop or warehouse space. Note variety of door and window openings. Every Stran-Steel building is site-styled and planned for maximum efficiency of the specific operation.

QUALITY-BUILT STRAN-STEEL BUILDINGS

Choice of 6 Colors . . . any Size That'll Suit Your Site

100% Useable: Precision-engineered and mass-produced Stran-Steel buildings give you unobstructed widths of 32′, 40′, 50′, 60′, 70′, and 80′ with lengths in 20′ and 24′ multiples. Sliding doors for smooth and efficient material movement fit equally as well on ends and sides since Rigid Frame members support the building's weight.

Beautiful: Your choice of 6 attractive factory-applied Stran-Satin Colors—blue, bronze, green, gray, rose, and white. Two durable, long-lasting layers of vinyl-aluminum coating are baked on over zinc-coated steel.

Low in Cost—Easy to Finance: You can finance your building over 5 years with a 25% down payment on the Stran-Steel purchase plan and that includes the *complete* structure—foundation, heating, lighting, tax and other building costs. For full details, mail the coupon or call your Stran-Steel dealer today. He's listed in the Yellow Pages under *Steel Buildings* or *Buildings—Steel.*

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Please send data on Stran-Satin Color and complete literature on industrial buildings. I'm interested in a building approximately _____ ft. x _____ ft. to be used mainly for _____
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Title _____ Phone _____
Company _____
Address _____ County _____
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One in a series by "the men that make the most of them"

Polyol Portraits:

the ETHYLENE POLYOLS

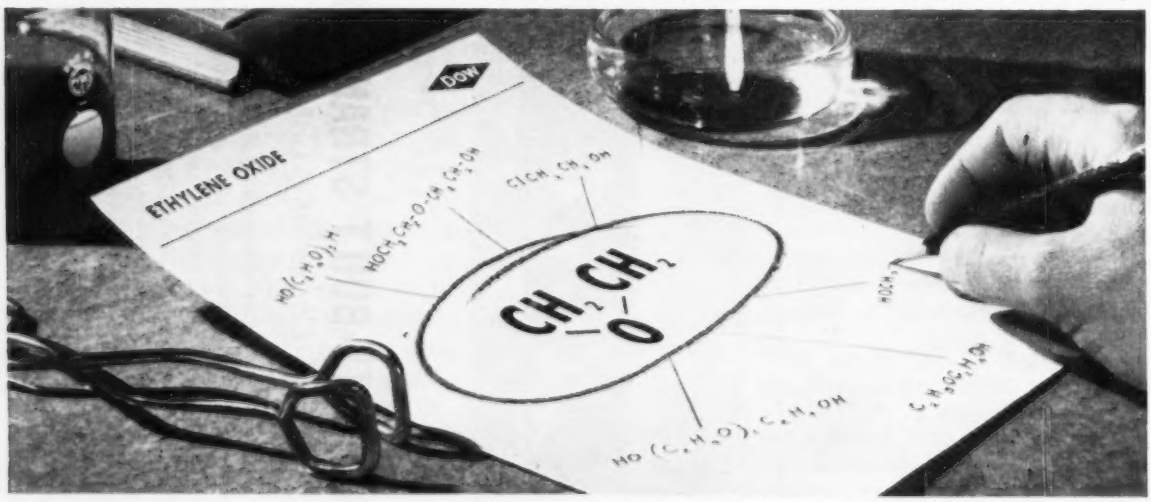
Ethylene oxide is the forefather of one of the main branches of the huge polyol family—the ethylene glycols and polyethylene glycols ("forefather" because it is the basic raw material from which they are made). This group of chemicals has become, in a relatively few years, a highly important segment of industrial chemistry. Dow has played a leading part in the development of ethylene-derived polyols. Today, it offers a selection unmatched for both diversity and quality.

Ethylene Oxide, unlike many commodities, hasn't been on the price escalator in recent years. In fact, its price is less today than it was ten years ago!

In making ethylene oxide, Dow uses the chlorohydrin process to maintain close control over the quality of ethylene-derived products. As Dow is a leading producer of two of the ingredients used in this process—caustic and chlorine—these chemicals are never in short supply. And the other ingredient is also a "captive"—Dow maintains cracking plants for the express purpose of producing ethylene.

Thus Dow can—and does—exercise meticulous control over EO production, from well to warehouse. Result: *Quality*. Unexcelled uniformity and purity. These are the ground rules at the five Dow producing plants that supply abundant quantities of EO for the foreseeable requirements of industry.

The industrial glycols—ethylene, diethylene, triethylene and tetraethyl-



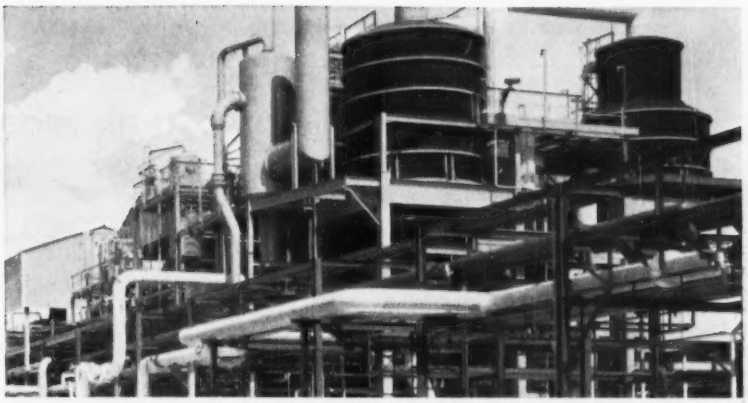
From basic ethylene oxide comes a widely diverse array of talented polyols.

ene glycol—are governed by these same rigorous quality controls. Many painstaking measures are taken to keep the quality standards as high in the derivatives as they are in EO.

A new Dow producing plant went on stream in March of this year at Plaquemine, Louisiana. The new facilities provide more than adequate capacity for Dow's extensive line of ethylene-derived glycols. They supplement the Dow plants which have been producing these polyols over two decades.

Dow frequently tailors these glycols to meet special customer specifications. To aid petroleum benzene producers, for example, Dow developed a special UDEX® brand diethylene glycol. For manufacturers of electrolytic condensers, Dow met an extremely exacting specification for ethylene glycol. So exacting, in fact, that perspiration from the thumb of a man would throw an entire drum "off spec"!

In polyethylene glycols, as in the entire realm of polyols, Dow lays claim to "the world's widest line". Available in both solid and liquid form, these Dow PEG's cover a broad spectrum of physical and chemical properties. Average molecular weights range from 190 to 21,000 . . . viscosities (centistokes at 210°F.) from 4.1 to 6,400. Complete or partial solubility with hundreds of liquids makes this group of chemicals useful in formulating myriad products. The terminal hydroxyl groups, for example, enable the polyethylene glycol molecule to take part in esterification reactions resulting in many useful surface-active agents and emulsifiers.



New Dow plant at Plaquemine, La., joins other EO producing facilities.

From the original EO to the shipping dock, Dow quality control watchdogs scrutinize each PEG production operation. As a result, the quality and uniformity of Dow polyethylene glycols are unsurpassed. Dow frequently custom-tailors PEG's to meet special requirements of Dow customers. This special service makes one more good reason why an increasing number of companies buy their PEG's from Dow.

Six modern Dow bulk terminals speed glycols and PEG's to users throughout the nation. These are strategically located at Bayonne, New Jersey; Chicago, Illinois; Midland, Texas; Plaquemine, Louisiana; Oakland and Torrance, California. Drum quantities are warehoused at many different points throughout the United States.

The salient point to keep in mind in any discussion—whether it centers on ethylene oxide, propylene oxide, glycerine or any of their hundreds of derivatives—is this . . .

Dow is Basic in Polyols

Whether you're in the market for glycols, PPG's, PEG's, glycerine or any of the hundreds of other Dow polyols, you always receive these benefits:

1. You always get the highest quality and uniformity in Dow polyols because Dow makes and controls the quality and uniformity of all the *ingredients* for all their polyols.

2. You are assured of plentiful, continuous supply. As Dow itself is the original source for all raw materials, it closely controls all factors of availability.

3. You can look forward to stable, predictable prices because ingredient costs—again, controlled by Dow—are not subject to severe market fluctuations.

4. From the creative cauldrons of polyol chemistry at Dow come scores of new polyol products and polyol improvements each year. There are literally *no material limits* to the range of new developments that can be custom-made for Dow customers!

It's easy as falling off a drum full of polyols to get in touch with "the men that make the most of them". This team of scientists, engineers, production and marketing specialists—all highly experienced in polyols—is at your service. Simply call the Dow sales office in your area, or write THE DOW CHEMICAL COMPANY, Midland, Michigan, Chemicals Merchandising Department 1101AM5-16.

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The Polyglycols number many active members, among them three new products developed by Dow research—polyepichlorohydrin, polystyrene glycol, and polybutylene glycol. All three are adaptable as intermediates in the production of the new polyurethanes and in the surfactant field. Many promising applications in the paint, petroleum, detergent, plastic industries.

The Polyethylene Glycols are available in twelve molecular weights from E200 to E20,000 and ranging from viscous liquids through waxy and hard, tough solids. Very useful as plasticizers, lubricants, solvents and as carriers in cosmetic and pharmaceutical preparations.

The Polypropylene Glycols "P" series liquid through entire molecular weight range, P250 through P4000. Employed as lubricants, solvents, plasticizers and anti-foam agents. Polyglycol P2000 (resin grade) has gained widespread acceptance for use in urethane foams.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

DOW

WHY THEY PRUNED THEIR PRODUCT LINES

	Company	Product	Specific Reasons
1. Special marketing problems	Diamond Alkali	Blackleaf agricultural chemicals	Product line seasonal, not big enough to warrant retail marketing costs.
	Glidden	Eastern distribution of Durkee table margarine and salad oil	Competition with customers; inadequate return on investment.
	Merck	Bulk chloral hydrate	Competitive imports.
2. Product obsolescence	Pennsalt	Refined amylnaphthalene	Competition from cheaper alternates; low profit.
	National Aluminate	Papermill slimicides	Replaced with better cost-performance products.
3. Insufficient return on investment	Hercules Powder	Cellulose acetate	Low profits; falling demand.
	Southern chemical firm	Sanitary supply items	Low profit; low sales.
	Midwest chemical firm	Petrochemical products	Lack of demand and raw materials.

Competition Swells CPI Casualty Lists

Decision to drop a product or an entire product line is never an easy one for the chemical sales department. Yet, it's often the smart thing to do. Culling can often boost sales, improve return on investment and even hike sales staff morale. The timeliness of these truisms was brought home last week in a CW survey of sales management.

During the past two years, CPI experience with product dropping has been varied. National Aluminate (now Nalco Chemical), over the '57-'58 period, for example, modernized its product line by dropping 82 development products and 12 commercial items. At the same time, 32 development products were commercialized.

And in the volatile pharmaceuticals business, Abbott Laboratories ousted 51 products last year, while Parke, Davis cut its line 15% since '56.

Why Drop? Major reasons for dropping a product, say sales executives, are low sales, low profit and low return on investment. All three, says Merck Chemical Division's director of sales and marketing, Thomas Treacy, are related. Market price levels, he adds, are often significant.

With development products, says Nalco's general product manager, Robert Rydell, the basic reasons are market-development failure and cost-performance failure. Often, a broad line of related products is consolidated into a compact line where multipurpose products have diverse applications.

Product obsolescence also rates high as a motive for product pruning. Pennsalt withdrew from refined amylnaphthalene because dodecylbenzene proved an effective and cheaper alternative in many applications.

Product obsolescence is frequently the result of competition from new items in a company's own line. Cowles Chemical, for instance, says it has not yet dropped one product that it has not replaced with a new, improved item made by the firm.

Competitive marketing problems can play a major role in the decision to keep or drop products. Glidden sold part of its Durkee's Famous Foods operation because investment return failed to meet standards and because the firm found itself competing with present and potential customers in the East and Midwest.

Omens: Warning signs that it's time to kill a product are much the same, say sales managers, as reasons for dropping. Best indications, says Nalco's Rydell, are a drop-off in sales or a flattening of the sales curve.

Wyandotte, too, ranks sales-curve flattening as a major reason. Sometimes, says a company spokesman, "the market starts fast, then loses steam. That's a good indication that predictions may be wrong."

Profit decline or a lower return on investment, which often stem from a fall in sales, are, of course, major

Louisville Dryer—10 feet in diameter, 10 stories long!

Turn a ten story building on its side, and there'd be room to spare on either end of this huge pit lathe at Sharon, Pennsylvania where this 10′ x 110′ Louisville Dryer was fabricated.

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warnings. One Southern-based sanitary chemical maker, once it realizes that a product's sales or profits are dragging, takes a hard look at promotion, sales pitch, packaging and every other factor that might influence the sales appeal. If everything measures up, the product is a prime candidate for the axe.

Decisions to drop are a long time in the making; many companies report that a year or two may elapse after the first omens are recognized until the ultimate decision is made. Few make a decision before six months. Many companies — e.g., Merck and Abbott — regularly review product sales and profits.

Merck's Chemical Division took advantage of a recent major reorganization of its sales function to do some judicious product paring. Several hundred products were dropped from one or more of its four basic marketing areas, although many were continued in its subdivision package line. The same study also served, says Treacy, to revamp the number of package sizes used for specific items.

Customer Relations: Chemical firms report varied experience in customer-relation problems when they elect to pare a product. A fair number tell *CW* that they rarely encounter unfavorable reaction. Many others, however, run into trouble.

Biggest problem comes when the product is needed by the customer, when no other domestic producer exists, and when the supplier is also selling other materials to the same customer. When alternate sources of supply exist, there is almost never a problem. But accounts sometimes vent their displeasure at being "stranded" by refusing to buy other items from the same supplier.

Nalco believes that the basic problem is to get the customer used to a new product and the work entailed in acquiring experience to use it. To ease the difficulty, says Rydell, Nalco contacts the firm before a changeover, sets up necessary controls and trains the employees.

Adequate advance warning to customers is essential in minimizing friction. No firm contacted by *CW* gave less than 90 days, many give six months or more. Generally, the customer is first notified either through a visit by top-level executives or sales staffers. Letters are used generally only after a personal visit. During the visit, supplier personnel explain in detail the reasons for the dropping, suggest alternate supply sources. Says Wyandotte: "We don't leave them stranded."

Customers sometimes try to pressure suppliers into continuing an item. This and other difficulties can be handled or eased by a number of methods:

- Extending the cutoff point.
- Raising price sharply every six months or so.
- Offering to continue supplying the product if the customer agrees to buy in sizable quantity.
- Encouraging the customer to build up inventory prior to cutoff.
- Offering the customer "how-to-make-it" advice. (Almost all firms in *CW*'s survey indicated that they would do this if necessary.)

Sales-Staff Problems: Occasionally, a producer finds that its own sales staff is opposed to product-dropping. No salesman likes to lose any possible opportunity. Moreover, sales staffers tend to be more volume-conscious than profit-conscious. The problem is lessened, of course, when a replacement is available—often the case in drug and specialty lines.

Sales managers observe that trouble can often be averted by explaining the facts behind the pruning at a special staff meeting. An Eastern firm goes even further, solicits opinion of local managers on how best to meet all problems arising from cutoffs.

Many companies, however, encounter little or no resistance from the sales staff. Parke, Davis, which informs salesmen three to six months in advance of formal announcement to the trade, says its salesmen are used to high drug obsolescence rates.

Actually, says Merck's Treacy, salesmen often gain from a decision to remove unprofitable listings. They are able to concentrate their energies on good sellers and the morale-depressing effect of "slow movers" is eliminated.

Interestingly, many chemical firms observe that salesmen often increase sales after a line is pared. One large Eastern solvent supplier, which reduced a line of 300 items to about 60, now enjoys both higher sales and better profit. And those are two good reasons why management keeps close tabs on the product mix.

Longer Life for Lights

Results of new research on lightweight, 55-gal. tighthead steel drums holds promise this week of eliminating some problems shippers have been encountering. The work, sponsored by the Steel Shipping Container Institute, the Manufacturing Chemists' Assn., carrier agencies and other trade associations, indicates that addition of a third hoop to the two normally used on the drums may cure some of the currently troublesome filling problems.

Some users have reported that the new drums, made with a 20-gauge wall (0.0359 in.) instead of the conventional 18-gauge (0.0478), have a tendency to collapse from the vacuum formed when filled with hot products and later moved to a cooler environment. The third hoop provides reinforcement to prevent collapse.

The drums were introduced late last year after motor and rail carrier classification board officials decided—after extensive tests—to permit their use in nonhazardous chemical service on a multitrip basis (*CW, Sept. 13, '58, p.* 52).

But problems soon cropped up. Besides filling difficulties with hot liquids, some light-gauge-drum users found the drums were more readily dented and punctured than the heavier, 18-gauge containers. And some reconditioners have been cool toward accepting the lightweights for reprocessing. Refurbishers generally pay $2.25 to $2.75 or less for secondhand drums, and their support of light-gauge drums is essential in developing markets.

The 20-gaugers sell new for about 60¢ less than the standard 18/18-gauge drum, in quantity purchase. The price differential for the three-hoop lightweights will probably be slightly less than that because of higher production costs.

Because of the difficulties, some purchasers of the 20-gauge containers have turned again to the 18-gauge unit — but three-hoopers may win them back.

Chemical firms have been buying some 8-10 million new light- and heavy-gauge drums of the total 17-20 million drums made each year. Lightweight drum production will probably account for 20% of production—3-4 million units/year.

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For more information on how you can sell more Atlantic ULTRAWETS, write or wire Chemicals Division, The Atlantic Refining Company, 260 South Broad Street, Philadelphia 1, Pa.

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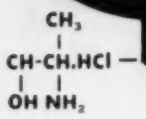

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Latest Look at Distribution

Important changes are shaping up in chemical transportation and packaging.

In essence, that's the news stemming from a two-day symposium on the subject just concluded in Cleveland.

The meeting, sponsored by the Manufacturing Chemists' Assn., brought together trade association officers, federal officials and top industry traffic and packaging men. Among the many predictions:

- Freight rates, after a long climb, are apparently stabilizing.
- Chemical industry use of truck trailer on flat car (piggyback) is slated for a big surge.
- More and more dry granular or powdered chemicals will be shipped in tank- or hopper-type truck transports.
- Packaging research will provide more-efficient, more-economical containers.

Taking a sharp look at the freight rate picture: Union Carbide's senior traffic manager, Frank Tighe. The freight rate that was $1 in '46, he said, is now $2.12. But the broad, across-the-board hikes that produced this rate, he believes, are a thing of the past. Future increases, he predicted, will be selective. That's because carriers have learned that the general boosts often shift customers to other forms of transportation, do-it-yourself operations or plant relocation.

At the moment, the government's Interstate Commerce Commission is facing big decisions on important freight rate proposals. Included are such matters as special incentive rates for shippers moving a specified percentage of shipments by a given carrier. The next few months, Tighe told the meeting, "will demonstrate whether ICC will allow carriers to establish competitive rates based on their own inherent advantages."

Much will depend on what is a "reasonable freight rate." Introduction of electronic calculators, including one at ICC, may make cost determination accurate, help determine the best role for each form of transportation.

Tighe came out strongly for incentive rates encouraging loading of cars, trucks and vessels to full carrying capacities. And he sees eventual adoption of incentive rates by both rail and truck carriers. Looking far ahead, he speculated that pipeline shipment of chemicals over long hauls may someday be a reality.

Accent on Trucks: Because of the boost in rail freight rates in recent years, many chemical companies now have sizable truck fleets. Hence, it's not surprising that many companies stand to gain from "Plan 3" piggybacking, which Monsanto's assistant general traffic manager, Irby O'Brien, calls "a major breakthrough in transportation technology."

This system involves rail transportation of shipper-owned or -leased trailers between rail terminals: the shipper pays the cost of moving trailers to and from the rail yards. Because Plan 3 requires limited capital investment on the part of the shipper and because it offers economical, fast, dependable and almost damage-free shipping, says O'Brien, the system's potential is "virtually unlimited." Stressing economy, he reported that common-carrier truck service between St. Louis and New York costs $1.40/100 lbs. in a typical case. Under Plan 3, the cost might be as low as $1.06/cwt., if total lading amounted to 70,000 lbs.

Plan 3, however, faces trouble. It is being strongly attacked by motor-carrier associations, which are trying to get ICC to ban the practice.

Piggybacking and its water transport equivalent, "fishybacking," is now used for dry materials. But, believes James Weaver, assistant traffic manager for Columbia-Southern Chemical, trailer shipment of liquid chemicals on flat cars and ships is coming. The use of tank vehicles in such service will require extensive study and perhaps new ideas about construction—shell thickness, center of gravity—to cope with problems of surge, safety and return of empties. But Weaver firmly believes the problems will soon be surmounted.

Dry Boom: Shipping progress isn't being confined to liquids, however. Recent introduction of pressurized air-slide tank trailer equipment may revolutionize some aspects of bulk handling of dry materials. Typical is a unit with a low-pressure blower that

MgO spells opportunity

IMC reports on another outstanding property of its new High Purity MgO—remarkable heat resistance.

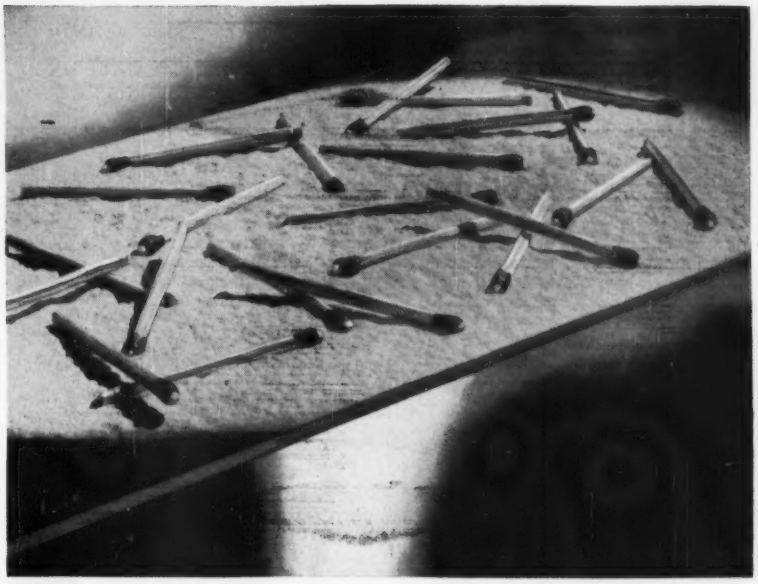
For many years, International's potash mining and refining operation at Carlsbad, New Mexico, has been producing large amounts of by-product magnesium chloride brine in conjunction with potassium sulfate. We are recovering values from this magnesium chloride by thermal decomposition to produce magnesium oxide. The product is better than 99% pure — highest purity ever achieved in carload lots.

Unbounded application

Heat resistance is one standout property. As a result, a firm is presently experimenting with it to develop a rocket nose cone capable of re-entering the earth's atmosphere. Another of its chief virtues is ease of handling, due to its low hydration rate.

Using MgO as an addition or substitution, many chemical process industries have been able to impart desirable — and hitherto unattainable — properties to their products. To elaborate:

- Improving the physical and chemical characteristics of magnesia has resulted in substantial savings. Using MgO as an extender, it's possible to obtain a high purity blend at low cost.
- Chemical manufacturers are making high-purity magnesium salts and chemicals from International magnesium oxide because of its relatively low cost and easily controlled reaction rates.
- By replacing ordinary alkali precipitants with MgO, several plants have been able to increase their process efficiency and reduce production costs.



Among its other applications: Electric furnace fusion for high temperature applications . . . in high-grade ceramic and glass formulations . . . for acid neutralization and uranium ore treatment . . . in thermocouples . . . as a substitute for alumina. Due to its low boron content, this International product has been the main source of MgO for U.S. Atomic Energy Commission applications. And the limits of its potential are nowhere in sight.

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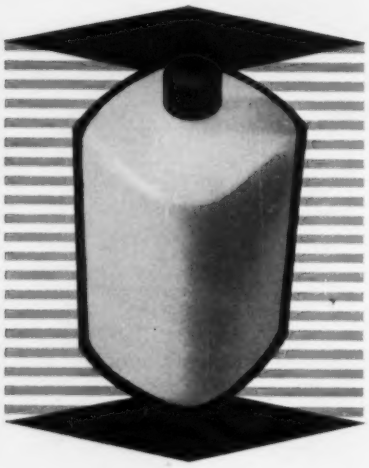

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forces pulverized cargo into storage bins as far away as 150 ft., through a 4-in.-diameter rubber hose. The method, says Cyanamid's general traffic manager, Gerrit Van Schaick, eliminates the standard bucket, belt, screw or other auxiliary mechanisms. Moreover, he claims, pneumatic delivery enables "bulk loads to be delivered without contamination and spoilage that might result from unsheltered handling."

Handling cyanamide by an air-slide truck method between two of its plants, American Cyanamid replaced 29 covered hopper cars and a conveyor system with three trailer and two tractor units, was able to free eight laborers for other work. Total cost savings amounted to 43%. That's why Van Schaick expects bulk dry trucking to rival tank trucking.

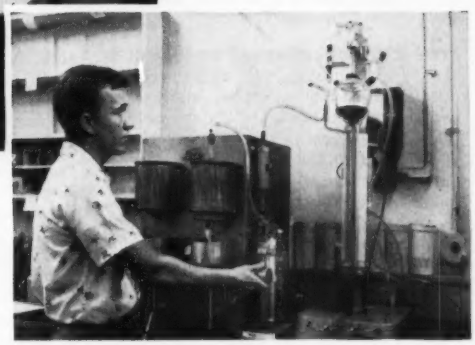
Transport Surge: Growth of liquid tank trucking is moving at a fast pace, according to statistics cited by the president of the National Tank Truck Carriers, Inc., Lester Wilsey. In '55, he said, 1,671 tank trailers were operated by for-hire carriers. In '57, the number was 3,389. Interstate transportation of chemicals is a $60-million business. In '57, chemicals accounted for 5.8% of all tank-truck tonnage and 20.5% of all tank-truck revenue.

This year, a joint committee of MCA and NTTC is tackling several problems. One concerns direct filling of small containers (as small as one gallon) from tank transports. This practice, says Wilsey, is unsafe and inefficient.

Another problem: how to boost efficiency of tank trucks by using equipment designed for multiproduct service—e.g., liquids one way, dry materials on the return haul. Other developments cited by Wilsey: bulk carriers for plastics, carbon black and liquid fluorine.

Wilsey also explained why chemical cartage is more expensive than petroleum product hauling. The chemical user, he declared, often needs a lined tank costing $30,000, while the oil carrier can get by with a $10,000 steel transport. And, over 40% of the mileage of chemical tankers is rolled up while equipment is empty.

Restrictions on the quantities of flammable liquids that can be carried in various cities and "illogical routing



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Product Research and Development—A few years ago Snell was retained to develop new products, applications, and markets for sugar. Extensive research and development work by Snell resulted in the creation of a new synthetic detergent—based on *sugar!*

Product Application—A Snell client in the paper industry, for whom we had developed a fine additive, wanted to explore uses in other fields. Unfortunately, their highly qualified staff's experience was limited to the one field. Snell, with experts in practically every product field, found the new product has potentialities as both a good emulsifier and a paint plasticizer. Only the very largest manufacturing companies can duplicate the breadth of experience and background the Snell "brain-trust" of technical experts can offer you!

Product Improvement—One Snell client found their product, an adhesive bandage, slipping in quality. Tape was going gooey in storage on druggists' shelves. Snell research helped this client bring his product quality up to equal the best on the market, and retain his share of sales.

Product Evaluation—A Snell brewery client wanted to expand production and take advantage of a more efficient production technique but feared the taste of the beer might suffer. Snell food technologists, taste panels, and engineers checked the new process and hundreds of samples of beer made under new and old systems, recommended the switch to the more profitable modern process. The change went unnoticed by the customers, and sales continued to climb.

Market Research—A Snell client with a waste product had briefly considered building a plant to use it to manufacture another product; but had given up after their own brief survey showed the new product to be already overproduced. When they consulted Snell for checking, however, Snell predicted there would be a shortage within three years. The client waited two years, built the plant—and now has a profitable new product instead of a waste!

Toxicology—One of the largest frozen food companies began getting complaints on the flavor of one of their green vegetables. Since hundreds of thousands of dollars were at stake, they consulted Snell to find out what was wrong. Snell by analyzing tests, and checking on the farm, was able to prove that the taste—actually toxic—was due to a new type of insecticide sprayed on the fields hundreds of yards away on a windy day long before the harvest!

Engineering—A large midwestern firm desired to produce its own brand of instant coffee, to possess outstanding flavor, body, and bouquet. They engaged Snell to design their extraction line, which is now economically producing a superior product, and have since doubled capacity. Since that time, two additional plants have been modified under our supervision to increase production and improve product characteristics.

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dictated by regulatory authorities" also boost chemical transportation costs. More liberal regulations—consistent with safety—would be a big help, Wilsey suggested.

Packaging Prospects: Chemical shippers stand on the threshold of significant packaging developments. Take fiber drums, for example:

MCA and the Fibre Drum Manufacturers Assn. currently are testing use of these containers for liquids. So far, the study has produced detailed drum requirements and compiled industry experience to date, says FDMA's managing director, Glen Mather.

Use of fiber drums in liquid service is now limited to nonhazardous products.

Mather forecasts broader use of fiber containers for chemicals. Helping: the recent approval by regulatory authorities of heavier maximum ladings. Moreover, some fiber drum companies have set up a reclaiming service. If broad reuse markets can be developed, the per-trip costs of fiber containers will fall markedly.

Research is also being pushed by steel drum makers. A special project at Battelle Memorial Institute, reported William Hanrahan, vice-president of the Steel Shipping Container Institute, is seeking ways to develop containers of still-lighter gauge than the recently reintroduced 20-gauge, 55-gal. steel drum (*see p. 60*). Shape, diameter, height, gauge and chime construction are under study.

In plastics, news centers about 250- and 500-gal., all-polyethylene drums, just introduced. These units, predicted Pennsalt's packaging engineer, Robert Schaefer, may well find use as portable tanks when properly palletized.

Thumping hard for unit loads and bulk containers was Du Pont's materials-handling and packaging consultant, Thomas Mangold. He foresees growing use of expendable bulk containers with capacities ranging from 1,000 to 2,000 lbs. and for returnable units designed for 2,000-4,000-lb. loads.

Many of the developments brought out at the MCA symposium will not be available, of course, for some time. But their breadth and scope clearly indicate that traffic and packaging executives are working hard for improvement and economy.

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Description and uses of

ALKANE,* detergent intermediate

Oronite's detergent alkylate, ALKANE, is the world's leading raw material for today's annual five billion pound synthetic detergent industry. Oronite ALKANE is an alkyl aromatic which is readily converted into highest quality syndets—liquid or dry; household or industrial.

Behind Oronite's leadership lies a continuing research and technical service effort which extends from the raw materials for polymer and alkylate to customer assistance in the formulation, manufacture and evaluation of finished detergent products.

From a product quality standpoint, a highly pure product has been achieved in ALKANE. The problems of unsaturates and other impurities have been almost completely eliminated. You can always depend on Oronite to keep its dodecylbenzene of unsurpassed quality for either oleum or SO_3 processing.

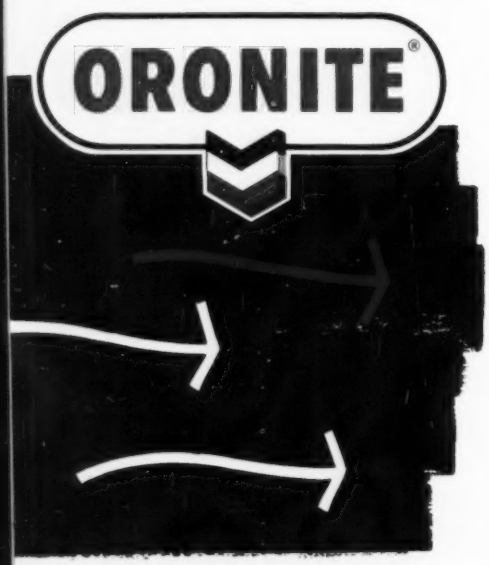
SURFACE ACTIVE AGENTS

SA-88. Oronite SA-88 (sulfonic acid) is an intermediate detergent in liquid form, resulting from the sulfonation of Oronite Alkane detergent intermediate. The major advantage of SA-88 is that it offers compounders a wide selection of neutralizing agents to produce finished detergents with tailored characteristics.

Wetting Agent "S" & Detergent Slurry. Both materials are paste type ALKANE sulfonates derived from caustic neutralization of SA-88 (sulfonic acid). They are easily processed into liquids or dry detergents in flake, granule, bead or powder form.

D-40* and D-60*. Dry detergents which can be used "as is" or with builders for cleaning, wetting, dispersing or foaming. Greatly employed in household cleansers, washing products, pre-cast concrete products, fire fighting, textile, leather and/or processing, air pollution control and in surface coatings. The D-40 series is available in granule, flake or powder form.

Dispersants NI-E, NI-O, NI-W. All of these products are nonionics in liquid form of the alkylphenol ethylene oxide condensate type. Dispersants NI-O and NI-E are oil soluble, with NI-O being slightly more hydrophilic. NI-O and NI-E are used primarily in the formulation of dry cleaning detergents and for the preparation of industrial emulsifiers. NI-W is water soluble and finds its primary use in compounding heavy duty household and industrial detergents.



ISOPHTHALIC

Oronite Isophthalic is proving to be one of the most important basic new materials to the surface coating and plastics industries in the past half century.

Isophthalic, first produced by Oronite, is a white crystalline product similar to phthalic anhydride in appearance but differing greatly in physical properties and reaction characteristics. Isophthalic forms all three types of esters. Simple esters for plasticizers; complex esters for alkyd resins and for polyesters; high molecular weight linear polymers for films and fibers.

For up-grading industrial, exterior and interior architectural paints and baking finishes, isophthalic offers superior performance characteristics. Better color and gloss retention, faster "quick-dry" and superior flexibility, hardness and impact resistance, better resistance to film checking and cracking, excellent non-yellowing properties, better adhesion to metal surfaces, tougher, longer lasting films—all can be obtained from isophthalic resins at the same or lower raw material costs.

For plastics—polyesters, polyamides, polyester-amids, reinforced plastics of unsaturated polyester types and for plasticizers—Oronite Isophthalic materially improves present products, offers opportunities for new products.

Reinforced plastic products with greater physical strength at no increase in weight; better resistance to heat and flexing; greater impact strength and retention of strength under and after stress and exposure to time, temperature, water, chemicals and weather—these improved features have been proven in actual experience at reasonable cost with unsaturated polyester resins made with Oronite Isophthalic.

Ask your resin supplier about isophthalic polyester resins, or contact Oronite for name of resin supplier nearest you. Let Oronite demonstrate how isophthalic can improve the products you use or market.

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versatile Oronite products

PHTHALIC ANHYDRIDE

Oronite Phthalic Anhydride, the first to be produced from ortho-xylene, has been considered the standard of quality in alkyd and polyester resin manufacture, in plasticizer production and in organic synthesis. Oronite's affiliation with one of the world's largest producing and refining oil companies assures you of a dependable source of supply.

Delivery of Oronite Phthalic Anhydride, in molten or flake form, is made from bulk storage terminals in close-by Eastern and Mid-Western centers. Oronite Phthalic Anhydride is a basic ingredient in paints, plastics, pigments and a host of other products.

Maleic Anhydride. White crystalline product used in manufacture of synthetic resins, paints, dyes and plastics.

TEREPHTHALIC ACID

Oronite offers another "first" with 99%+ purity Terephthalic acid, the highest purity obtainable commercially. Large scale production of this chemical intermediate is now available. Terephthalic, a light-colored, fine crystalline, free-flowing, dibasic acid has great potential in the fiber and plastics industries. It could offer you new opportunities in present or new products. Write Oronite for further information.

Fumaric acid. High quality, free-flowing, crystalline powder used in manufacture of polyesters, polyamides, alkyds, vinyl and other copolymers, adhesives, improved drying oils, plasticizers, surfactants, additives and textile sizes.

PHENOL, U.S.P.

Consider these important advantages in doing your phenol business with Oronite. (a) Consistent high quality phenol is always assured from Oronite's unique cumene manufacturing process. (b) Oronite is the only U. S. phenol producer with complete control of raw materials and manufacturing from start to finish, thus assuring uninterrupted supply.

Oronite Phenol is shipped by tank car or tank truck from Richmond, California, New Orleans, La., Chicago, Ill., and Paulsboro, New Jersey.

Acetone. Oronite cumene process Acetone has a purity of 99.5% minimum; typically 99.8%, and more than complies with the ASTM requirements. It is used as a vehicle in nitrocellulose lacquers, varnishes, rubber cements and in the manufacture of rayon, celluloid and cellulose acetate plastics.

POLYBUTENES

Greatly increased production capacity of this versatile chemical was recently announced. Oronite polybutenes are synthetic polymers, chemically inert liquids nearly water white in color. They are available in a wide range of viscosities—up to 20,000 S.S.U. at 210°F. Because of their non-drying, chemically inert and tacky characteristics, they have proven useful in a wide variety of end products such as: sound deadening, insulation and calking compounds; as a dielectric in high voltage cables and capacitors; as an ingredient in the manufacture of pressure sensitive adhesives and leather goods. For Polybutenes technical bulletin or product samples — contact the Oronite office nearest you.

XYLENES

Meta 95%—Para 98%—Ortho. Oronite Meta-Xylene offers many opportunities in the production of pharmaceuticals, dyestuffs, polyesters, perfume ingredients and fine chemicals. Para-Xylene is used as an intermediate to manufacture synthetic fibers and films. Ortho-Xylene is an intermediate for making phthalic anhydride and other chemicals. Write for further information on product properties and data on typical tests.

GAS ODORANTS

Oronite manufactures and markets a complete line of odorants to meet all safety requirements of the natural and liquefied petroleum gas industries. Knowing many applications are different, Oronite is always willing to adapt odorant products to individual needs. Talk over your requirements with Oronite.

LUBE OIL ADDITIVES

Oil additives which reduce wear and increase performance of gasoline or diesel driven equipment are a specialty of Oronite Chemical Company. Formulations to customer's exact needs and specifications are the prime consideration of Oronite additive recommendations.

Oronite additives improve base oils by providing: detergent-dispersion action, resistance to oxidation, rust and corrosion protection. They give reduced engine wear and cleanliness under all operating conditions.

(Information continued next page)

The research and testing facilities behind Oronite additives are the most advanced in the nation. A leading producer of petrochemical products, Oronite has the resources, experience and facilities in oils and chemicals to consistently produce the finest additives possible.

Fuel Oil Additives. Mixed with diesel, furnace and jet oil fuels to stabilize against deterioration, sludge formation and for preventing corrosion in presence of water.

Gelling Agent—GA-10. Makes possible the production of synthetic lubricants that will meet high performance specifications. For multipurpose grease lubricants; automotive, aircraft, marine, nuclear reactor or special purpose greases.

HIGH TEMPERATURE HYDRAULIC FLUIDS

Oronite was "first" to develop a revoluntionary new hydraulic fluid that will operate hydraulic systems at the intense temperatures created in supersonic aircraft or missile flight.

Oronite High Temperature Hydraulic Fluid 8515 and 8200 are non-petroleum based silicate ester fluids, have low vapor pressure and constant viscosity in addition to desirable electrical properties.

Other ORONITE products

ADE-50. A quaternary ammonium compound in clear liquid form used principally as a high grade sanitizer and germicide.

Alkylphenol TD. A dodecylphenol, clear and slightly viscous liquid, which can be reacted to produce various types of non-ionic detergents. Potential uses include dyestuffs, insecticides, germicides, fungicides and anti-oxidants.

Butadiene. Polymerization grade, 98% minimum purity.

Hydrogenation Catalyst. Used in de-sulfurization process to remove sulfur, nitrogen and metals from petroleum feed stocks.

Copper Naphthenate. Used as a preservative for burlap, canvas and cellulose products against attacks of bacteria, fungi, wood parasites and marine organisms.

TECHNICAL ASSISTANCE

Oronite's philosophy on technical service is that of translating product research data to your individual needs. Oronite recognizes that each raw material application is different but that helpful supplementary assistance can be provided on an individual basis. When a company becomes an Oronite customer, technical service continues—providing the customer new data as developed, suggesting ways of cutting costs, cooperating in every way possible to make your association with Oronite more valuable. Why not call Oronite and see for yourself the depth of our technical assistance on your problems. Our wide experience as a leading petrochemical source is at your disposal.

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5379

PHOTOS BY EDMUND GILLMEIST

At Du Pont's test center, building materials are tested for combustibility, quickness of flame spread.

Finding the Best Value in Plant Equipment

The photos on this and the following pages show some of the more than 70 tests that are being run this week at Du Pont's Wilmington, Del., engineering test center. The aim: to find the best value in plant engineering commodities—items such as valves, plastic pipe, protective coatings, roof ventilators and shipping containers—for which the company spends about $150 million each year.

Du Pont isn't alone in seeking the most for its money. It's estimated that chemical companies spend 7-8% of their operating expenses for these materials.

But testing is often considered too expensive because it ties up research and plant operating talent. The Du Pont test center, which recently completed its first year of operation, shows how the test work can be carried out at low cost, turn in big savings. Carl "Goose" Gosline, who heads up the test center, estimates that each dollar invested in testing returns $3-4 in savings.

Knowledge Pool: The test center helps engineering, maintenance, purchasing (all those concerned with the everyday materials for new plant construction, existing plant maintenance and replacements). The aim is to get a pool of knowledge, prevent duplication in the search for the best products.

Use of the knowledge pool keeps actual physical testing to a minimum. Here's how the program worked in a typical case, finding the best value in ceiling air diffusers:

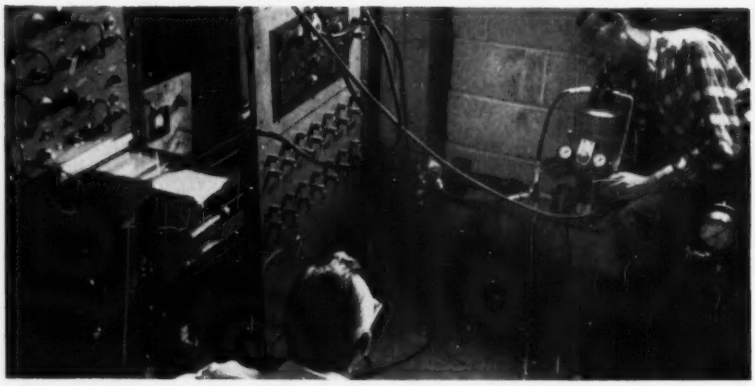
Objective of the diffusers: to spread

Plastic pipe is tested for ability to carry chemicals. Plastic sheet protects personnel from splashes.

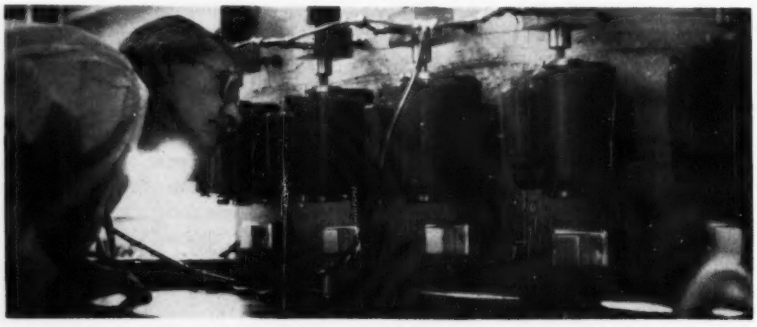
air from a duct throughout a room, draft-free. The test center gathered data on 31 diffusers of 11 manufacturers. Designs included those with fixed and adjustable grills or dampers; prices ranged from $1.65 to $26.

The test center, using visible smoke, checked the diffusers for their ability to spread air without draft, and ran noise measurements too. Each diffuser was rated on both performance and price. And, although test center personnel actually ran the tests and reported the results, the ratings were made by representatives of engineering, maintenance and purchasing. One factor that might have been overlooked without this system of rating: some diffusers threw too much air back against the ceiling, caused a dirt ring to form around the unit, which adds to cleaning cost—a point made by maintenance representatives.

Often, there is very little actual test operation—detailed examination will do the job. For example, engineers made a feature-by-feature study of roof ventilators arranged side by side at the test center. Except for noise level checks, features such as



VALVES, valve mechanisms are timed for response to input signals.



BALLBEARINGS, driven by electric motors, are rated on service life.

Dialogues about some 3700 Eastman Organic Chemicals

The unclean amine

First man: We have three new homologous sets of alkylamines.
Second man: They'll have to do.

F.m.: Do you want to know what they are?
S.m.: In order to imbue them with life and warmth and gaiety and a light dusting of wryness, it will probably be helpful if you will designate them by name and number.

F.m.: *Octylamine* (Eastman P7588); *Dioctylamine* (Eastman P7748)—
S.m.: What gives with the P's? Why are you making with P's? What is the matter with these chemicals?

F.m.: We can discuss that presently if you consider it of interest. *Trioctylamine* (Eastman P7723); *Decylamine* (Eastman P7772); *Didecylamine* (Eastman P7724); *Tri-n-decylamine* (Eastman P7759); *Dodecylamine* (Eastman P7750); *Didodecylamine*—You ought to get a good headline out of the sound of that one.
S.m.: Let us not twit like giggling schoolgirls. What's its number?

F.m.: Eastman P4519. The last is *Tridodecylamine* (Eastman 7727).
S.m.: Where's the "P" for that one?

F.m.: On second thought, you had better put a "P" there, too.
S.m.: Why?

F.m.: Because of impurities, they should be labeled Practical Grade.
S.m.: I, too, am familiar with the introduction to the catalog. How sad is your story?

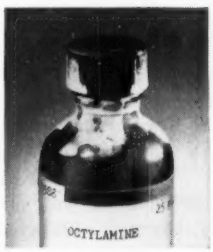
F.m.: Sometimes it's hard to keep an amine clean.
S.m.: Echoing down a quarter-century, the parochial, boyish laughter of doctoral candidates in the Department of Organic Chemistry now assails our ears. What fouls alkylamines?

F.m.: $2R_nNH_{3-n}+CO_2+H_2O \longrightarrow R_nNH_{4-n}OCONH_{4-n}R_n$ (O)

$n = 1, 2, 3$

S.m.: Can we tangibilize that remark? Dramatize it?

F.m.: Sometimes a little spillage on the bottle lip grows a mustache of alkylamine carbonate. If you wished to accelerate this unpleasant effect, you could put a little dry ice around the bottle. However, the reaction reverses if the carbon dioxide tension falls. I suppose now you will want to photograph a foul-mouthed bottle.
S.m.: Of course.



F.m.: Just like that?
S.m.: Just like that.

Subtlety

First man: We recently filled an order for 100 kilos of the dinitrophenylhydrazone of a certain halogen-substituted aldehyde.
Second man: As usual, a barren beginning. Kindly develop the theme further, that I may judge the generality of its appeal.

F.m.: You said it!
S.m.: What I said?

F.m.: Generality. For laboratories as thoroughly generalized as those which produce Eastman Organic Chemicals, the manufacture of 100 kilos of a new compound, first crack out of the box, takes us into the upper reaches of the volume scale at which we operate efficiently. Whereas for DPi monoglycerides or Eastman *Industrial* Chemicals, 100 kilos would scarcely wet the pipes. Nevertheless, we delivered a good, sharp-melting hydrazone, and we didn't have to soak the customer.
S.m.: When you say "new" compound, you don't mean new to the human race, do you?

F.m.: No. Such hydrazones are very well known to analytical chemists. They react our *2,4-Dinitrophenylhydrazine* (Eastman 1866) with carbonyl-containing compounds as a means of identifying such compounds through the characteristic melting points of the hydrazones formed. Many of these hydrazones are so insoluble that gravimetric assay is possible.
S.m.: The beauty of your speech in no way mars its triteness. What are we peddling?

F.m.: The concept that if the *product* of some familiar analytical reaction is being considered for large-scale usage, the price of the analytical quality reagent employed should not discourage a request for quotation.
S.m.: Somewhat subtle point to be advertising, perhaps? Could we switch to something a little more substantive, maybe?

F.m.: Sure. See *Acta Chem. Scand.*, *10*, 495 (1956).
S.m.: Which will promote — ?

F.m.: *Pyridine* (Eastman 214) and *Quinoline* (Eastman 218).
S.m.: For — ?

F.m.: Quite accurate end-point indicators for strong acid–strong base titrations.
S.m.: Indicating by — ?

F.m.: Smell.
S.m.: Now I am not sure you're being subtle enough. Can we offer an abstract?

F.m.: Nope.

Besides small talk, we also keep in stock some 3700 organic compounds which you order from "Eastman Organic Chemicals, List No. 41." You should have a copy. Distillation Products Industries, Eastman Organic Chemicals Department, Rochester 3, N. Y.

DPi

Eastman Organic Chemicals

Also...vitamins A and E in bulk...distilled monoglycerides

Distillation Products Industries *is a division of* **Eastman Kodak Company**

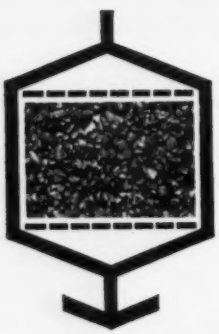
how to keep a guppy happy

Your pet fish—or your friends downstream will breathe easier and longer if activated charcoal keeps the water pure. Reducing stream pollution can often pay its way in profitable recovery of waste products, in better public relations. Well worth looking into.

how to smell no evil

Some people wear gas masks (containing activated charcoal). Others breathe air freshened with activated charcoal air purifiers. They (the people) work better, more safely. You save money by recirculating warmed or cooled air instead of blowing it away. Suggest you ask your plant or consulting engineers about it.

activated carbon



We supply a complete line of activated carbons for every purpose; design and prefabricate complete purification, separation, and recovery systems to meet your particular needs. Write for Bulletin J-100 and recommendations on your specific application. Barnebey-Cheney, Columbus 19, Ohio.

Barnebey Cheney

Gosline (center) and Campbell (right) fix test programs, prepare reports results.

assembly time, construction, ease of maintenance were rated on the basis of expert knowledge of the field. "But the entire job had to be done by the same people, at the same time—all agreeing on the ground rules," says Gosline.

The test center's reports are circulated to about 450 people at 85 plants and 20 laboratories throughout the company. And interim reports are circulated quarterly to keep those concerned posted on the projects that are under way but not completed.

Only Advisory: There is nothing binding about the reports. "Our job is to supply 'better' facts to those who make the decisions. There may be other factors, peculiar to local situations, that influence the actual choice," explains Gosline.

The reports aren't shown to outsiders. The center must work with vendors, of course. But the staff won't tell a vendor how his product stacks up against competition.

Figuring heavily in the test program is work to aid the Engineering Service Division's consultants. These people assist plant management with materials, mechanical, utilities, maintenance, materials handling, packaging and chemical engineering problems. Test programs run the gamut from comparative testing to select the best value, through repetitive testing for quality assurance and special testing to confirm basic engineering data.

The air diffuser and roof ventilator studies discussed above are examples of comparative testing. Repetitive tests are run on materials such as protective coatings and some stainless steel to assure that quality meets specifications. For example, by using the ASTM boiling nitric acid test for corrosion evaluations, many thousands of dollars worth of stainless steel that would have failed prematurely has been kept out of service. In one case, stainless steel for heat exchanger tubes was rejected because of excessive attack at the weld, although the rest of the tube met specifications.

Special testing includes fatigue testing of welding of thin walls to thick walls, occasional fact-finding in plant failures (e.g., a boiler-tube failure). On one occasion, a new plant had trouble feeding solids from a bin. Engineers, working on the problem at the site, supplied the test center with potential solutions. Working on an around-the-clock "crash" basis, the center built plant-size equipment, tested out the suggestions until one proved dependable.

The center may do test work requested by research and product development groups but does not generate programs of its own in these fields. And, it makes no attempt to

Left: Designed to operate under 300 psig. at 450°F, this vessel will be subjected to unusually corrosive service. Hastelloy, a non-ferrous nickel-base alloy, was specified to line the vessel. The ASME Code shell was first lined with narrow strips and segments by manual metallic arc welding. The welds were then covered by cap strips, heliarc welded to the liner. Multiple tests confirmed the excellence of the welds.

Below: Graver's skills in forming and lining vessels to conform to efficient operating requirements is demonstrated by the head for the vessel at the left. Not only must the fit be exact but all welding of the Hastelloy lining must be tight in order to protect the vessel against corrosion and the product against contamination.

Need This Protection Against Corrosion?

Hastelloy is one of the most effective metals to use in vessels requiring maximum protection against corrosion. But at the same time, it calls for precision welding. The cost of Hastelloy usually suggests use as a lining material, which puts a premium on welding skills. Graver has developed an expertness in welding Hastelloy not commonly available elsewhere. The advanced fabricating techniques used are the result of Graver's continuous welding research program. Graver's competence with Hastelloy is one of a number of reasons why it pays to call on Graver for fabrication of all types of alloys.

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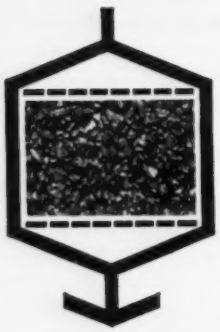

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Att: Wm. J. Jamieson, Area Development Director, Dept. CW-2
67 Broad St., New York 4, N. Y. WHitehall 3-5600

Device developed by test center helps solve problems in solids flow.

compete with routine testing activities of commercial test laboratories. In fact, it sometimes farms out routine portions of its program to laboratories in the area.

Organization Backbone: The test work is performed by a staff of 16, which includes five engineers. "Much of the operation's success rests with the technicians who have shown that it doesn't always take a lot of high-powered engineers to get results," says Bill Campbell, supervisor of the test center. And, when someone asks about costs, Campbell points to the simplicity of the facilities, set up in a former Navy warehouse with two trailers for offices.

Gosline and Campbell estimate that less than 1% of the company's engineering commodities have been looked at so far. "Even if we had examined them all, it's like painting a bridge," says Campbell. "There is a never-ending list of equipment put on the market that makes it necessary to continually re-examine and retest in many fields."

While some testing could be carried out at research laboratories and operating plants, the test center's first-year results show the advantages of a centralized program.

Control panel of automatic Recrystallizer plant. Photograph by Loebel.

International discovers new purification process...brings automation to salt refining

Last fall, after more than a decade of research, International Salt Company perfected the first new method of salt refining in over 150 years. This process has as its basis one of the most unusual facts in industrial chemistry: The major impurity in salt crystallizes out of solution as the temperature rises . . . while salt itself crystallizes out as the temperature drops.

In International's new process, a slurry of salt and brine is heated to 225°F. The salt goes into solution, and impurities (which remain undissolved) are separated out. Then the brine is flash-cooled to 140°F. Now pure salt crystallizes and is filtered out while any remaining impurities go into solution.

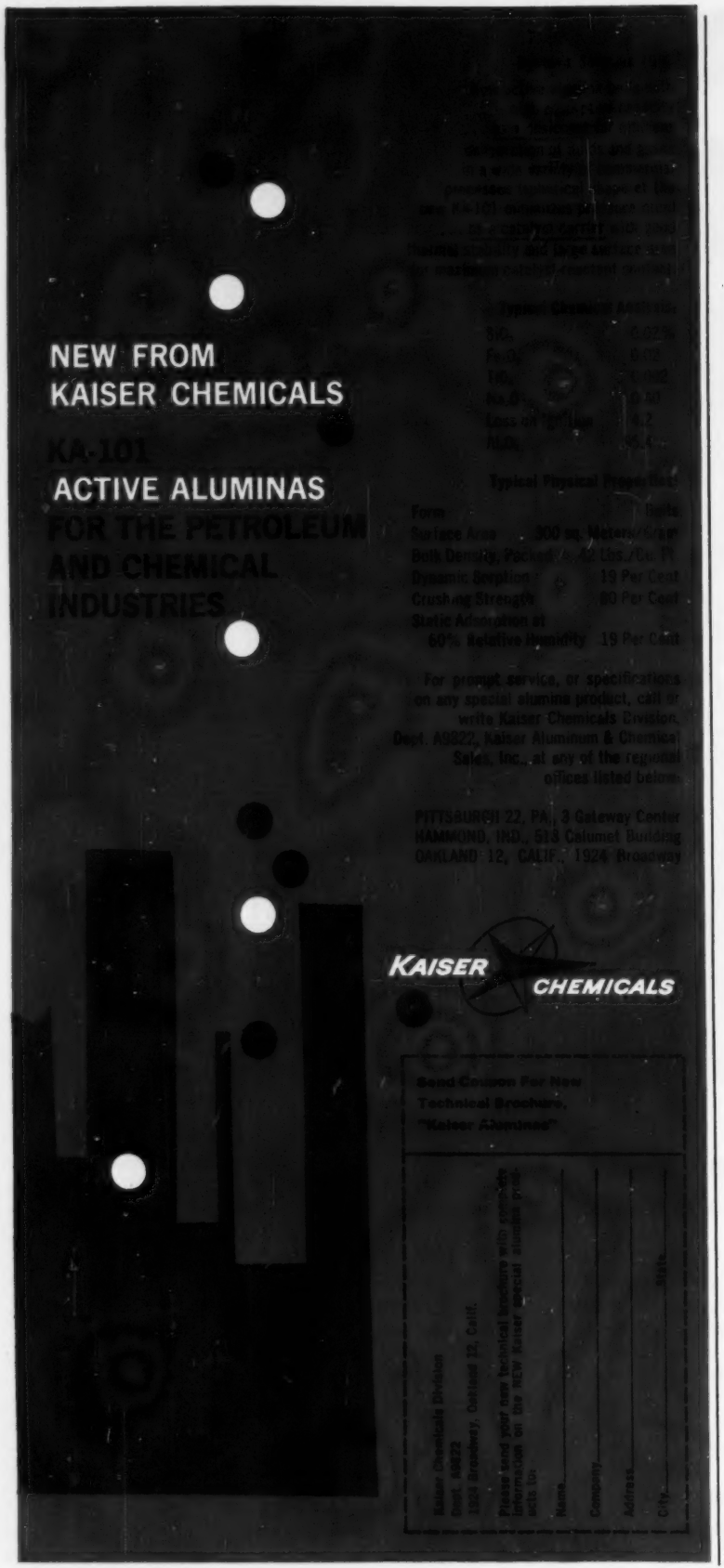
This process makes possible, for the first time, continuous, automatic refining of salt. With one man in control, International's new Recrystallizer at Avery Island, La., produces high-purity salt in one-third the time of conventional purification.

The scientific skill and research facilities that provided this "step ahead" are also at the service of any salt-using company. Contact International Salt Company, Inc., Scranton 2, Pa., or any of the offices listed below.

STERLING SALT . . . product of INTERNATIONAL SALT CO., INC.

First in salt technology . . . . first in salt for industry

Atlanta, Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Memphis, Newark, New Orleans, New York, Philadelphia, Pittsburgh, Richmond, St. Louis



PRODUCTION EQUIPMENT

Turbine Mixers: A new line of high-speed turbine mixers is offered by Kinetic Dispersion Corp. (95 Botsford Place, Buffalo 16, N.Y.). The KDZ 100 series has 10-, 15- and 20-hp. motors with variable-speed drives; the KDZ 200 series has 25-75-hp. drives. Turbines in the KDZ 300 series are designed for mixing tanks with special problems such as those produced by top, side and bottom entries. The 200 series offers a water-cooled blade for heat transfer during mixing.

•

Titanium Valve Assemblies: Fulton Sylphon Division, Robertshaw-Fulton Controls Co. (911 East Broad St., Richmond 19, Va.) is now making packless valve stem assemblies with seamless bellows made of titanium. The bellows, of Grade 55 sheet titanium, are being used in an all-titanium primary reactor loop for a uranyl sulfate solution; operating conditions: 300 C, 2,500 psi.

•

Teflon Fittings: Crawford Fitting Co. (884 East 140th St., Cleveland 10) is now offering its Swagelok line of tube fittings in Teflon; sizes: 1/16- to 1-in.-outside-diameter tubing.

•

Orifice Unions: A line of forged carbon steel, beveled orifice unions for joining sections of pipe, measuring and controlling liquid and gas flows under pressure, is a new offering of Clayton Mark & Co. (1900 Dempster St., Evanston, Ill.). The steel plate is shaped to fit the contour of the union seat, eliminates gaskets, snaps into place as the union is tightened. Sizes available: ¼- to 2-in.-diameter pipe; working pressures: 3,000 psi. at 100 F to 925 psi. at 900 F.

•

High-Efficiency Filters: Cambridge Filter Corp. (738 East Erie Blvd., Syracuse 1, N.Y.) is out with a new line of filters said to be capable of removing 95% of 0.3-micron particles with a pressure drop of 0.4-in. water gauge. Filter medium is glass-asbestos; 24 x 24 x 11½-in. filters have 1,000-cfm. capacity.

•

Air Vibrators: National Air Vibrator Co. (435 Literary Rd., Cleveland 13) offers the new Navco FR vibrator

for shake-out cleaning of flasks, pots and containers. The vibrating piston is the unit's only moving part. The unit operates on 35-65-psi. air.

•

Magnesium Panel Boards: Panellit, Inc. (7401 North Hamlin Ave., Skokie, Ill.) is making a new line of lightweight control panel boards of magnesium. These boards are intended to be easily altered in the field without blow-torch cutting and welding, can be faced with Formica or Mylar.

•

Temperature Sensors: Thermistor-equipped assemblies capable of detecting temperature changes of less than 0.001 F are new products of Victory Engineering Corp. (583 Springfield Rd., Union, N.J.). The units may be bolt- or screw-mounted, supply liquid, gas and air temperature data. Housings offered: stainless steel, aluminum, brass, plastic.

•

Plastic Hose: Resistoflex Corp. (Roseland, N.J.) is out with a new Teflon (Fluoroflex-T) transfer hose for acids and other industrial chemicals. Hose is rubber jacketed, reinforced with wire to prevent crushing or collapse. Interior Teflon layer is carried through hose and out over the face of the flange. Sizes: 1½, 2 and 3 in.

•

Compressor Piston Rings: Du Pont (Wilmington, Del.) will demonstrate new, self-lubricating plastic piston rings for compressors at the World Petroleum Congress in New York the week of May 31. The new rings, made from reinforced Teflon TFE-fluorocarbon resin, are said to have lasted more than 20 times as long as conventional cast-iron rings when exposed to wet hydrogen during field tests (2,000 hours, compared with 100 hours). In these tests, six rings were found sufficient for compression in a piston that required 26 cast-iron rings. No fluid lubrication is needed. Rings will withstand pressures up to 4,500 psi., temperatures from —320 to 500 F.

•

Tubing-Inspection Camera: Diamond Power Specialty Corp.'s Electronics Division (Lancaster, O.) has a new TV camera, nicknamed the Pencil, for inspecting the condition of welds inside 3-in. reactor tubes.

IS A-C POLYETHYLENE "X"* THE X FACTOR IN YOUR PROCESS?

Stories of successful application of A-C POLYETHYLENE are pouring in from so many fields and industries that we haven't had an opportunity to explore the apparently limitless uses of this exciting new polymer. So we're asking you! If your field of operation is even remotely similar to those below, it is very probable that A-C POLYETHYLENE can give you increased sales, lower costs and many other advantages. Find out today!

Look what it's done for others!

X **Injection Molders** are getting shorter cycles, complete control of flow, higher gloss, sure mold release, with the ability to mold larger and more intricate parts.

X **Polish Makers** use it in its emulsifiable form and call it the "Polish Maker's Polyethylene". They're getting finish durability, non-slip properties, and rebuffability!

X **Paper Converters** use it as a hot melt and are enthusiastic about the low-cost quality coating it offers. Grease resistance, scuff resistance and single feed to automatic machines are other advantages!

X **Dairy Carton Coaters** add it to waxes for their cartons, getting longer shelf life and reducing flaking, leaking and bulging!

X **Food Packagers** like the smarter, glossier appearance of their packages—less rub-off and scuff. Printing looks better, too!

X **Box Makers** coat interior surfaces of corrugated cartons with an A-C POLYETHYLENE-Paraffin blend to eliminate the need for liners! Scratch from paper fibers on fine finishes is eliminated!

X **Textile Finishers** find A-C POLYETHYLENE surprisingly versatile for sizes or finishes. Excellent hand, sewability, durability, abrasion resistance and many production advantages result from using this polymer!

X **Ink and Paint Manufacturers** are satisfied that A-C POLYETHYLENE adds anti-smudge and scuff resistance characteristics to their products!

X **Slush Molders** use A-C POLYETHYLENE with other polyethylenes and end up with a "brand new" material, giving them simpler production with lowest mold costs. The finished articles are tough, colorful and have fine detail!

X **Film Extruders** are using A-C POLYETHYLENE for faster extrusion rates, lower machine temperatures, easier gauge control and less all around machine stress. A-C POLYETHYLENE is a natural for coloring films. Color concentrates made with A-C POLYETHYLENE produce brilliant, uniformly colored film!

X **Squeeze Bottle Makers** are praising the glossy finish and even color when using A-C POLYETHYLENE. They like the faster molding operation, too!

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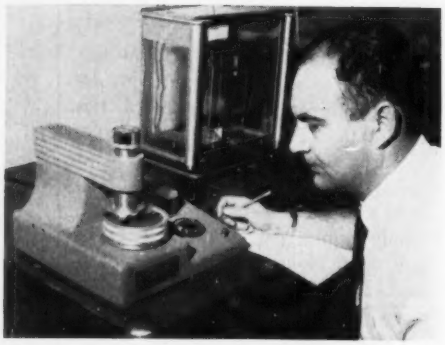
CYANAMID

Chemical Newsfront

MISSILE SEES RED—INFRARED. A relatively simple, yet unique, system guides the fantastic Philco SIDEWINDER air-to-air missile into target on the hot exhaust of enemy jet aircraft. Infrared radiations of the target attract the missile which can actually zoom into the tailpipe of a jet. Much of the printed circuitry in the SIDEWINDER incorporates FORMICA® *laminated plastics*, which must be compact and light and yet provide insulation against tremendous heat generated by rocket motors. **(Formica Corporation)**



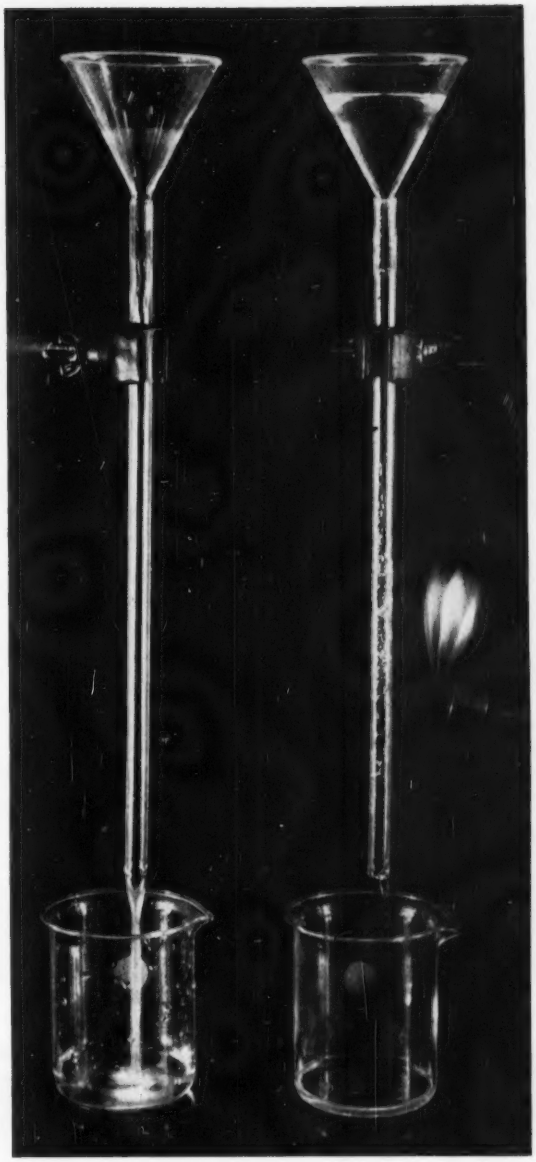
WEAR-TESTING is an essential and continuing process with Cyanamid's new CRESLAN® *acrylic fiber*. Laboratory physical tests are evaluated with thousands of hours of actual wear-testing in this fabric and market development program. Above, a lightweight suiting fabric of CRESLAN acrylic fiber and wool is subjected to a punishing appearance-retention test. Hundreds of thousands of hours of such tests have already been evaluated, making CRESLAN one of the most thoroughly tested new fibers in history. **(Fibers Division)**

INCREASED PRODUCTION OF COAL, vital for fuel, steel and chemicals, is possible using Cyanamid's AMERICAN® and BLACK DIAMOND® permissible explosives. Mining safety, too, is improved by the use of these time-tested products and Cyanamid's reliable electric blasting caps. These products along with Cyanamid's mining chemicals for the coal industry were on exhibit at the annual Coal Show of the American Mining Congress in Cleveland, May 11-14. **(Organic Chemicals Division)**

CYANAMID PICKS GENEVA, SWITZERLAND, as the site for the new Cyanamid European Research Institute, Inc. The new scientific center will be devoted to long-range basic research in the chemical and biological sciences. It will be staffed entirely with European scientists, whose work will be directed toward uncovering new basic scientific information. It is expected to provide an invaluable supplement to the diversified program of basic and applied research in which Cyanamid today is investing $25 million a year.

TODAY'S GIANT PETROLEUM INDUSTRY dates right back to this scene 100 years ago: Col. Drake, drilling in Titusville, Pa., brought in the world's first oil well. First exploited principally to provide light, petroleum grew in importance with the increasing acceptance of the automobile and now refineries and wells cover the entire world. Cyanamid, an international supplier of petroleum catalysts, as well as many other products, has kept pace with the industry, serving its needs as it changed from a brawling, lusty art to a highly technical automated industry.

(Industrial Chemicals Division)



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(Market Development Department)

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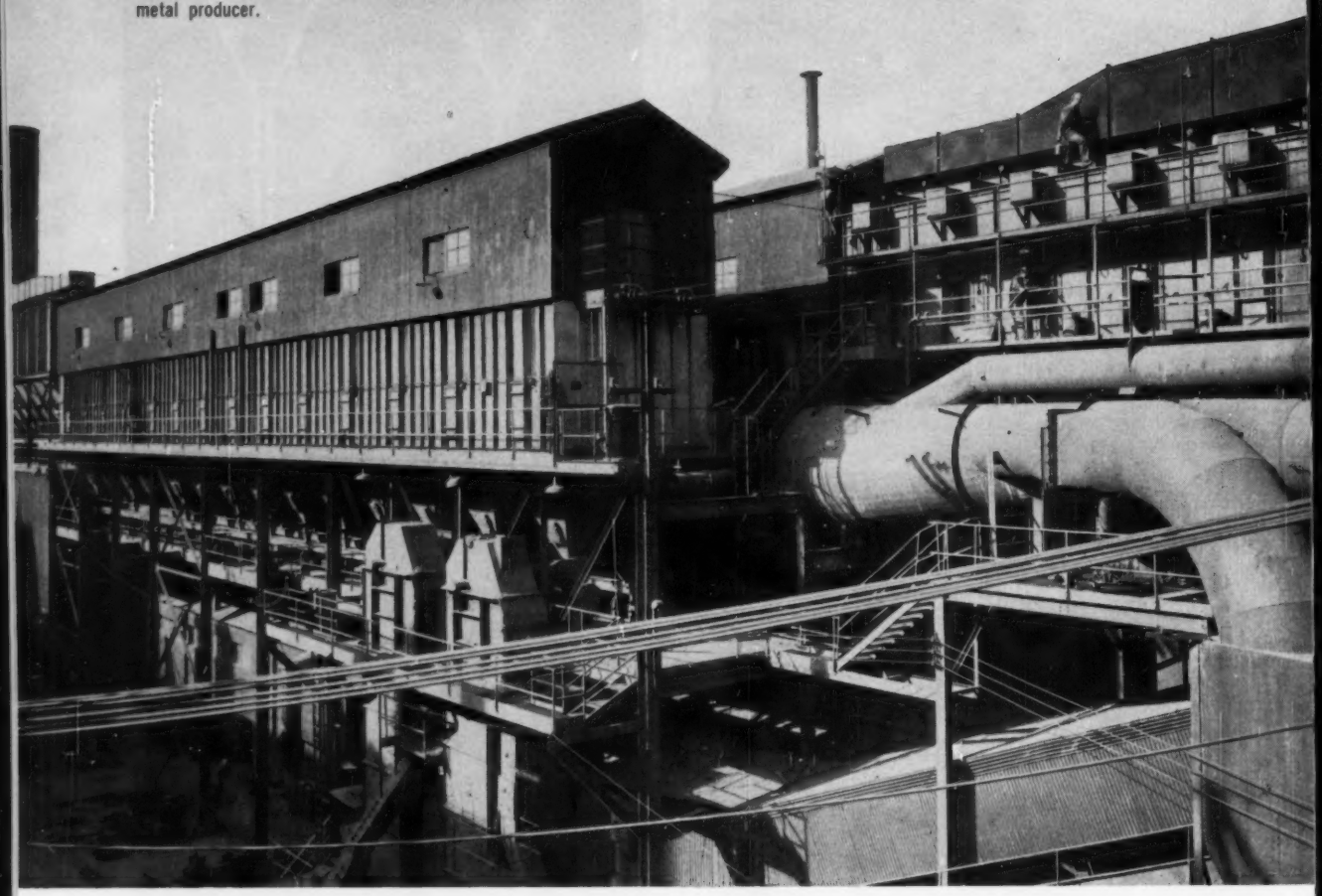

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These are results of Dracco Dust Control Engineering. Over 40 years experience in the industry assures soundly engineered systems, solidly built to last. Some of the world's largest installations, such as the one shown here, are being made by Dracco.

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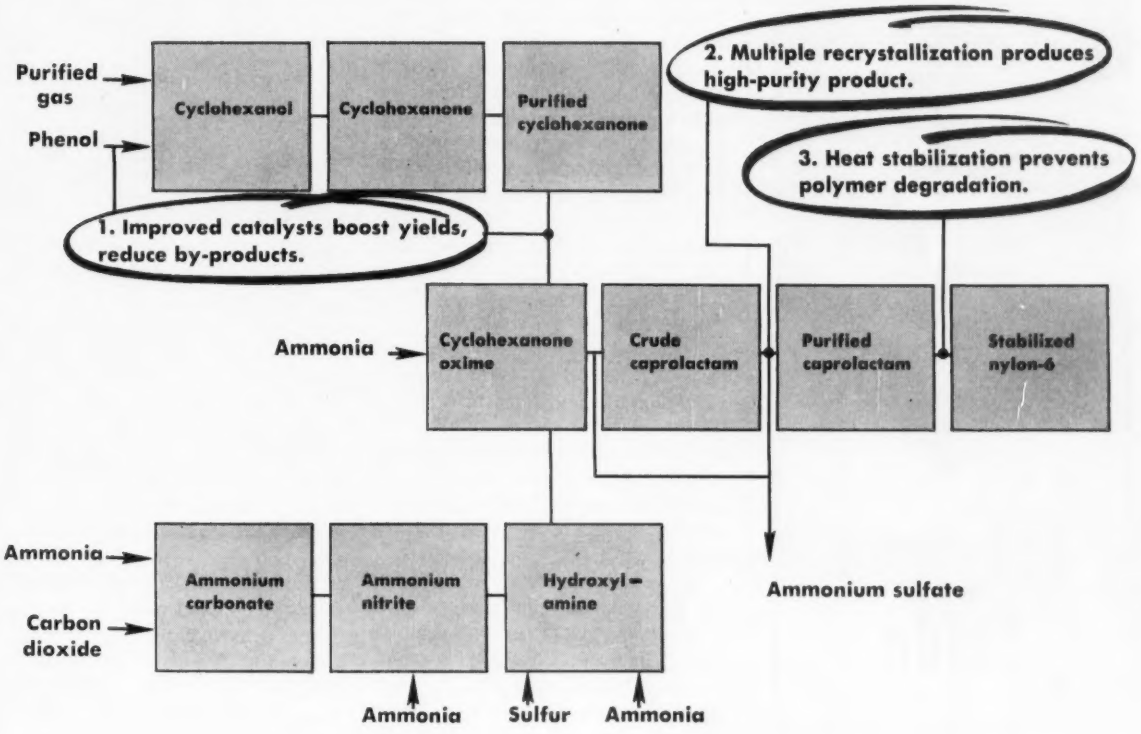
dust control equipment

(Pronounced Dray'co)

Three keys to Allied's high-purity nylon-6



Nylon-6 Grooms for Tire Competition

To make Golden Caprolan — the first successful nylon-6 tire cord (CW Technology Newsletter, May 2)—Allied needs exceptionally pure polymer. This week, details of the process for making both the polymer and the fiber are starting to emerge.

Secrets of this purity, which makes the polycaprolactam competitive in physical properties with nylon-6/6, lie in modifications of the process Allied has been using for a number of years. These improvements include: new catalysts that up yields, reduce by-products in the synthesis steps; purification of the crude caprolactam by multiple-stage recrystallization; and incorporation of an additive during polymerization that prevents heat degradation of the fiber.

Allied won't elaborate on any of these advances at present. But the wraps are off the main process steps. At its Chesterfield, Va., plant, the firm hydrogenates phenol to cyclohexanol, converts the cyclohexanol into cyclohexanone (which is purified by distillation), then reacts the ketone with hydroxylamine to make cyclohexanone oxime. Oxime is rearranged using oleum to yield crude caprolactam.

Purified caprolactam monomer is shipped to the nearby Hopewell plant, where it is polymerized in the presence of the heat stabilizer additive. Polycaprolactam is water-extracted to take out unreacted monomer, dried, pelletized, again extracted, dried, blended to insure uniformity, then extruded as yarn. An inert gas, containing mostly nitrogen, blankets the polymer during all heat processing steps.

Subsequently, the yarn is drawn to about four or five times its original length to orient the polymer and given about one-half twist per inch. For tire cord, Golden Caprolan is supplied as 840-denier, 136-filament yarn. It is also being used in marine cordage and other industrial applications.

Glenn Nesty, Allied director and research vice-president, explains that two problems had to be overcome in order to establish Type 6 nylon as a tire cord. First, the polymer had to be made in sufficiently high molecular weight to obtain its theoretically possible physical properties. While Nesty won't say what this optimum molecular weight is for Golden Caprolan, it is higher than that of previous commercial polycaprolactams. Second, it is necessary to preserve this molecu-

with technical service

MATHIESON

Ethylene Oxide

Many people find a need for technical assistance in using this reactive chemical. At the Mathieson Doe Run plant are men whose experience with ethylene oxide runs from equipment design to day-by-day production. From this group you can have help in planning or with problems of operation.

The technical service is there if you need it. If you want further information or data sheets, please write.

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CHEMICAL CORPORATION
Chemicals Division - 745 Fifth Ave., N. Y. 22, N. Y.

6564

lar weight by protecting the polymer from degradation. That's the function of the new additive.

Says Nesty "In all polymer systems, it's a fact that tensile strength and other properties are affected almost linearly by molecular weight over a certain range, then the curve becomes asymptotic. We found where the asymptote was and then manufactured there." Techniques for spinning the fiber have been altered too. Older spinning processes were based on adaptation of nylon-6/6 spinning techniques. But these caused regeneration of too much monomer during spinning of nylon-6. A "modest" amount of monomer is useful, however, in drawing or twisting the yarn, Nesty says.

Nesty, who is considered the father of the new fiber, has additional plans for expanding Allied's nylon-6 technology, although the firm says it has no plans to increase production at its 20-million-lbs./year-capacity Hopewell plant at this time. Most of this plant's output, running at near capacity, is said to be going into tire cord.

Earlier this year, Nesty told a meeting of textile researchers: "Thus far, most of our work in the field of nylon-6 has been basically centered on polycaprolactam itself . . . but experimentation also is now in progress on chemical modifications of nylon-6—for example, copolymers of caprolactam and other functional compounds. Potential improvements in fiber properties are indicated by these studies. Fibers made from such experimental copolymers show significant gains in tensile properties, ability to withstand exposure to elevated temperatures, and increased melting point over conventional polycaprolactam fibers."

He also believes the outlook for conventional fiber is good: "The relative economy and simplicity of production of 6-polymer from caprolactam give promise of still further development. Polymerization is carried out at low pressures, and relatively small quantities of water have to be withdrawn from the polymerization site. Continuous polymerization, a key to better uniformity, higher quality, and still lower costs, is more feasible than with nylon-6/6."

More than 20 years of commercial history lie behind nylon-6 (ε polycaproamide) in Europe, where the fiber is widely used in hosiery and other textiles. At least 30 plants around the globe now produce Type 6 polyamides. While nylon-6 has had a relatively short career in the U.S., it's been a lively one. And Golden Caprolan figures to liven things still further as it challenges nylon-6/6 and rayon in the 350-million-lbs./year (rayon equivalent) tire-cord market.

Allied's Nesty has sought new chemical modifications of an old polymer.

By 1963, U.S. demand for fiber and plastic derived from caprolactam is expected to edge past 100 million lbs. (*CW, Jan. 3, p. 32*) as Allied's National Aniline Division is joined by Du Pont and Commercial Solvents as major producers.

Tire cord will probably account for a substantial share of this output in the opinion of some industry experts. Nylon-6/6 tire-cord makers haven't been caught napping by the advent of the new nylon-6 fiber, however. Stabilized nylon-6/6, superior in heat and oxidative degradation resistance to previous nylon-6/6 tire cord is already being offered, and is currently in a seesaw sales battle with the new nylon-6 fiber. And rayon tire cord, present in the preponderance of original-equipment tires, is constantly being improved.

An example of this progress is Tyrex, worked out by Tyrex, Inc. (a group of rayon firms), which was developed to give tires high-speed strength.

Still, an estimated 53% of replacement tires now contain nylon cord, and this share is believed to be rising. Allied's new nylon-6 process is aimed at assuring the polymer of a place in this market.

KELLOGG CHECKS OUT

ANOTHER POLYETHYLENE PLANT FOR U.S.I.

Kellogg engineers make a final instrumentation checkout in the utility main control station at U.S.I.'s new Houston plant. If you are interested in the instrumentation phases of Kellogg's complete engineering, procurement, and construction services, send for 12-page Kelloggram, *"The Application of Innovation in Engineering Systems"*.

New 75-million-pound plant is fourth of five Kellogg polyethylene projects for U.S.I.

With the completion by Kellogg of the 75-million-pound plastics plant near Houston, Texas, U S. Industrial Chemicals Company's total capacity for PETROTHENE® polyethylene will be seven times what it was when U.S.I.'s first facilities went on stream in 1955. Kellogg is privileged to have played a continuing role in this rapid expansion.

Kellogg engineered and built U.S.I.'s first polyethylene manufacturing facilities at Tuscola, Illinois, as well as its Tuscola ammonia plant—added in 1955. In 1956, Kellogg was given the responsibility of doubling Tuscola's polyethylene capacity, and of doubling it again in 1957.

Recently Kellogg completed a polyethylene compounding plant for U.S.I. at its Tuscola complex. Currently Kellogg is working with U.S.I. on plans *now* to double the output of the new polyethylene plant in Houston.

The early and successful completion of Houston at its present 75-million-pound capacity reaffirms U.S.I.'s confidence in Kellogg plant engineering and construction, and is another example of this contracting organization's ability to work harmoniously with engineers of leading chemical companies.

If *you* are contemplating new facilities for the production of plastics, petrochemicals, or other chemical materials, The M. W. Kellogg Company welcomes the opportunity to discuss its world-wide engineering, procurement, and construction experience with you in detail.

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Fleet Nets CPI's Newest Raw Material

CW PHOTOS—JOE CRUZ

Fish boats, tied up at New Bedford docks, supply raw material.

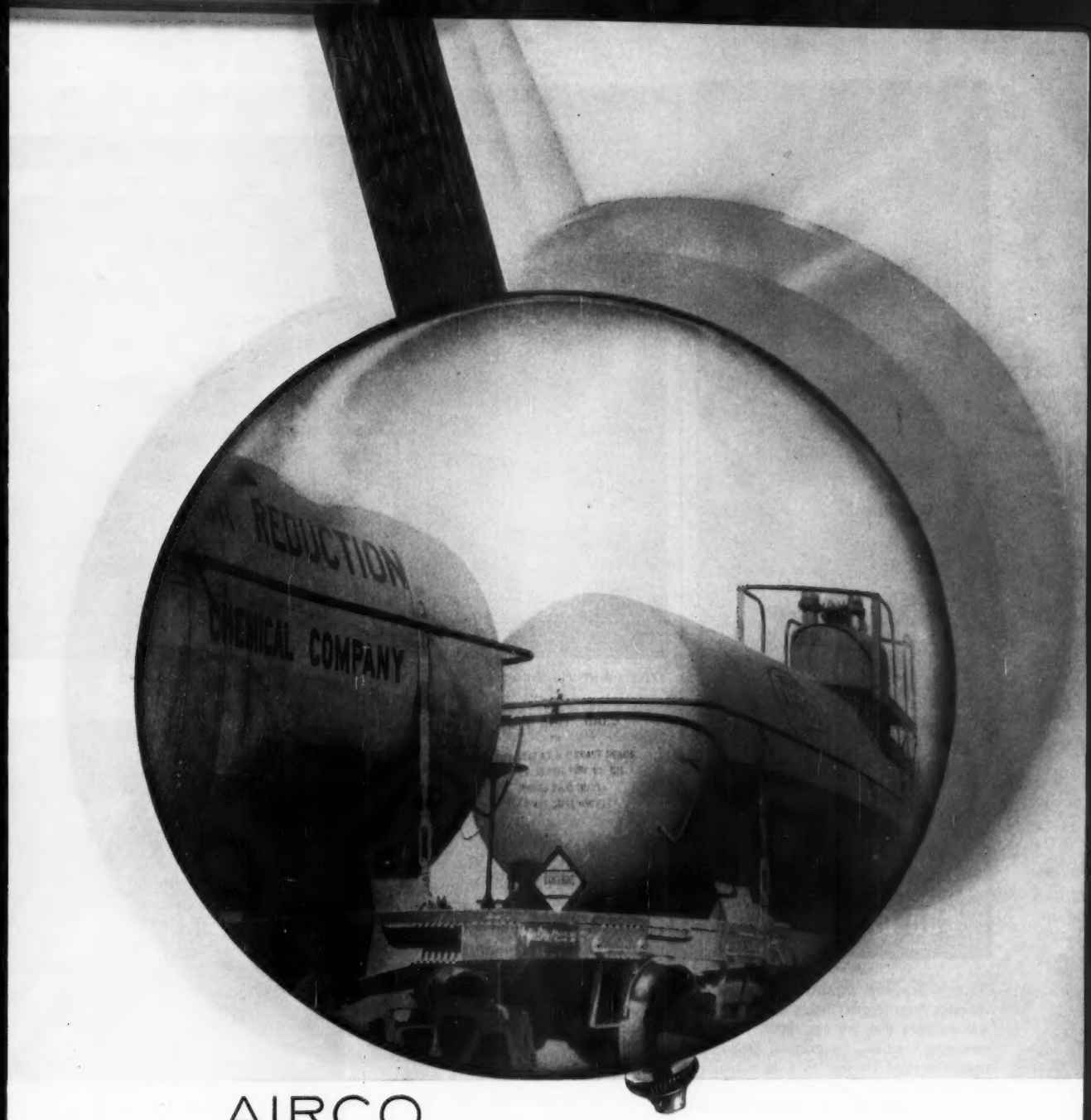
These boats supply raw material for the only plant of its kind in the world: it uses a low-temperature solvent-extraction method to produce high-protein food products for animals and human beings—from whole fish.

The plant, located in a historic fishing area, is the property of New Bedford (Mass.) Fish Products Co., subsidiary of VioBin Corp. (Monticello, Ill.). Main product is fish meal (ground fish with oil and water extracted) for animal feed. About 16 tons/day of meal and 1 ton/day of fish oil are produced from the intake of 75 tons/day of raw fish (the difference is water). In addition, 15 tons/month of meal are shipped to Monticello for conversion into odorless, tasteless fish flour for human consumption. This is said to be the only commercial production of fish flour in the world.

Chief advantage of the process is that it yields products of unusually high stability and protein content (70-80%) by keeping temperatures below 212 F. The conventional method of producing meal involves cooking the fish at high temperatures and pressing out the water and oil. Both steps reduce the protein value of the product. Currently, soluble protein values are recovered and sold as a separate product. In the new plant they are retained in the meal at no premium in selling price.

Other advantages claimed:

- Processing cost is no higher than in conventional plants.
- More efficient separation of meal and oil gives higher yields of these products — both of which are salable — and results in lower cost for equivalent amount of protein value.
- Better separation also gives meal predictable characteristics and unlimited shelf-life, and keeps it from contibuting a fishy taste to eggs, milk and meat provided by the animals, even when fed in large amounts.
- Any kind of fish can be used as raw material.
- Effluent water is pure, does not cause pollution.
- Plants can be built in settled areas without causing the offensive odors given off by the conventional



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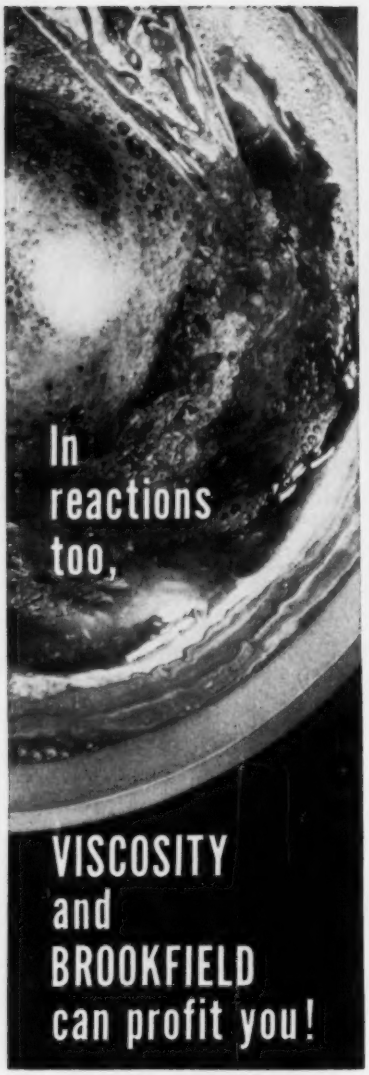

It's true. In-process viscosity measurement is the most direct progress report of many chemical reactions that you can obtain. In polymerization reactions, for example, Brookfield process-mounted Viscometran units eliminate the need for constant sampling, assure greater product uniformity and guard against run-away reactions.

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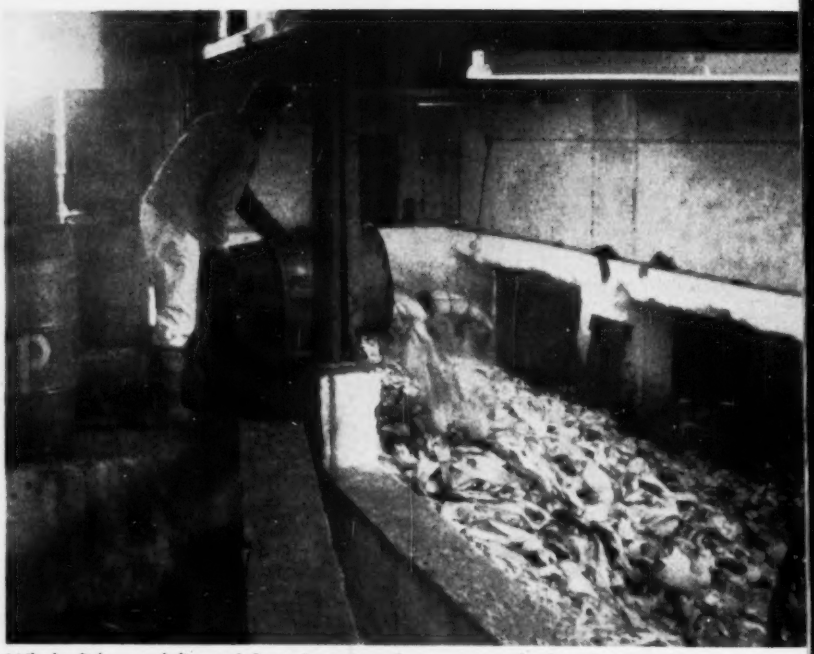


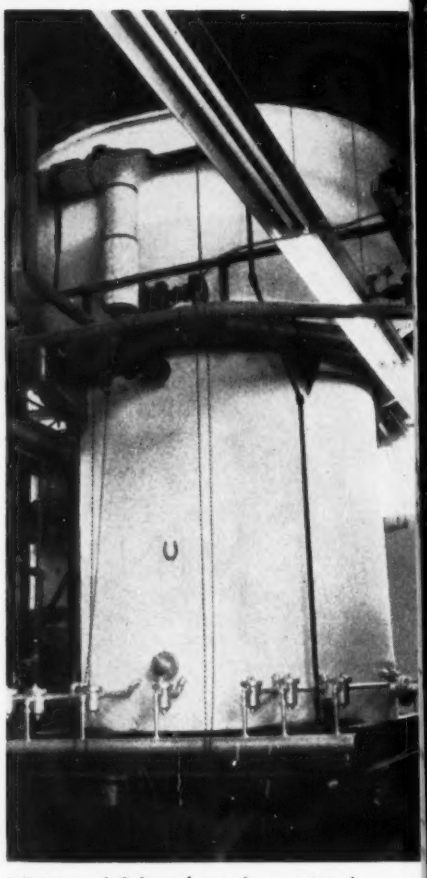
Whole fish are delivered from boat to plant, are washed and ground.

process. The process is not new; it's covered by U.S. Patents 2,503,312-3 and 2,619,425, assigned to VioBin President Ezra Levin, and has been used by VioBin for several years to produce specialized pharmaceutical products. Scaling it up for commercial-size production of fish meal posed special problems that were solved just recently, however. One of the main snags was finding a pump that would stand the abrasion of handling 10,000 lbs./hour of ground fish. Several types of pump were tried before a steel, lobe-type model, made by Ulrich Mfg. Co., finally beat the problem.

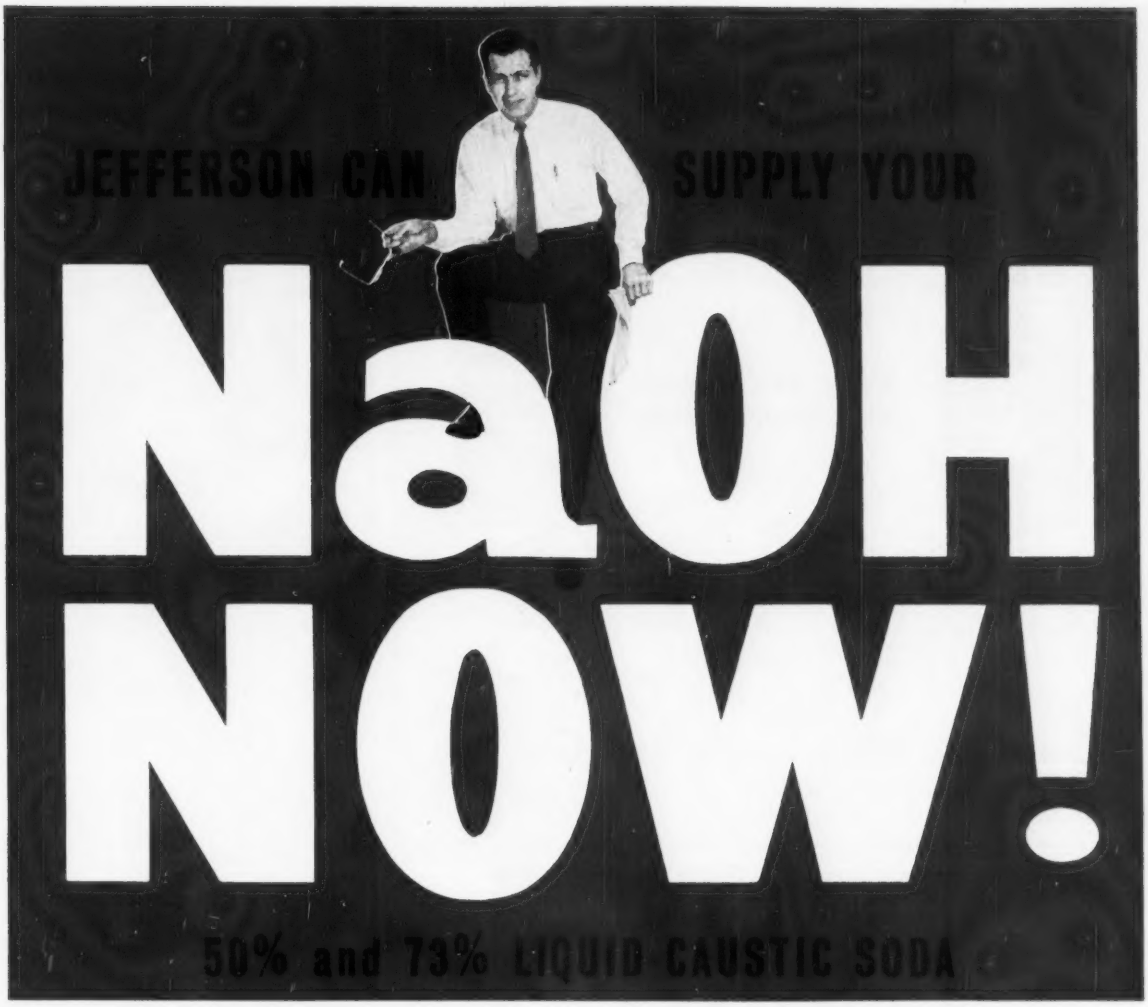
From Fish to Flour: Raw material for the new plant is any type of fish, such as menhaden, starfish, whiting or even the remains of fish from fillet houses, Plant Manager Carl Larsen says. Because of this variety, a process that would otherwise depend on the seasonal availability of certain types of fish can operate year-round.

The whole fish is ground to a hamburg-like substance, which is pumped into a primary cooker. Solvent—ethylene dichloride preheated to about 135 F — is added, and the mixture is azeotropically distilled at 160 F. Solvent and water are removed at the top and separated by decantation for solvent recycle.

Meal and oil are partly separated



Mixture of fish, solvent is azeotropically distilled in big cooker.



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Jefferson can also promptly supply your needs in soda ash, caustic potash and sodium bicarbonate. Before making any future commitments for these products, it will certainly pay you to check with Jefferson . . . 1121 Walker Avenue, Houston 2, Texas.

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Operator checks clarity of oil-solvent mixture, separated from meal.

mechanically, and a secondary cooker, at 180 F, finishes the separation. The oil goes through a solvent removal train — consisting of fat evaporator, settling tank, film evaporator and oil stripper — and emerges as pure, salable fish oil (price: about 7¢/lb.). Meal goes to a pair of desolventizers that deliver the finished product (price: 15¢/lb.). About 2% oil is contained in the meal (compared with about 10% in conventional meal); flour is made by removing residue oil by alcohol extraction.

Eye to the Future: Seeing the protein-deficient people of the world as the potential market, Levin predicts a big future for the process, cites current licensing activity as evidence: licensees are planning a plant in Greenport, L.I., N.Y., and building one in Salina Cruz, Mex. He also says that the process is adaptable to use aboard ship. In a recent seminar at the University of Illinois, Levin stated that a total capital expenditure of $500 million would be enough to "solve the problem of world starvation within 10 years." Less than 1 oz./day of flour is needed to satisfy minimum protein requirements, can easily be worked into the diet of any country.

As to producing flour for domestic use, Levin notes that the Food &

"If this is the only way we can keep our product uniform, we'd better switch to a fatty acid!"

More and more manufacturers are finding that fatty acids have important advantages over natural fats and oils for making a host of products: soaps and surfactants . . . textile finishes . . . cosmetics and toiletries . . . paints and plastics . . . lubricants . . . and numerous intermediates.

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Fatty acids are products of known composition and predictable behavior. They give maximum flexibility in the choice and ratio of fatty constituents. They have improved stability, because factors responsible for rancidity and decomposition have been removed.

Hidden Processing Costs Rule Out Fats and Oils. In the industrial soap field and in toiletries, the decision to saponify a fat or the corresponding acid may be an economic one, but many hidden costs of starting with the fat are frequently overlooked. The fatty acid yields savings in steam and labor, gives greater output per unit of equipment cost. It gives assurance of a uniformly good product, with the proper viscosity, odor and color characteristics. Greater flexibility in choosing fatty composition is possible, and products can be adapted to changing demands.

Controlled Composition Insures Product Acceptance. In many industries, fatty acids offer definite quality control advantages over fats and oils. For example, triple-pressed stearic acids like Groco 55L are produced with closely balanced physical and chemical properties which make these fatty acids invaluable in precise reactions. A case in point is esterification procedures. Such precision would be impossible with a natural fat.

Fast Reactions Make Equipment More Productive. In lube grease manufacture, fatty acids or their metallic soaps permit closer control and faster reaction during saponification than do fats and oils. Plant equipment can be used more productively. Better end products are possible. The use of oleic acids such as Groco 4, for example, with closely controlled titre, has done much to assure greases of uniform lubricating and bodying characteristics, greases which will not separate during long storage under extreme temperatures.

For more information on specification fatty acids for your consideration, send for the brochure "Fatty Acids in Modern Industry."

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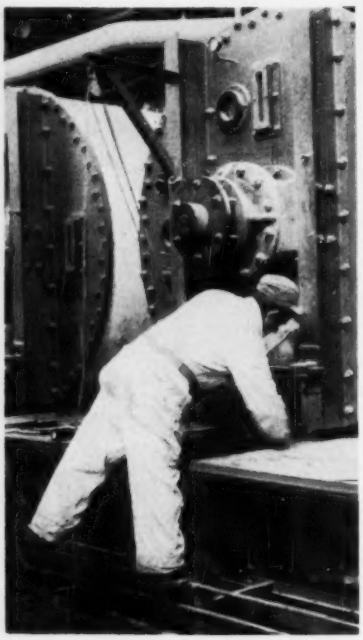

Desolventizers remove traces of solvent from meal, give pure product.

Drug Administration would require the deheading and degutting of fish used for human consumption, thus raising the price of flour for U.S. use to about 60¢/lb., compared with 20¢/lb. for whole fish flour. In any event, however, the best immediate market for the material seems to be overseas.

Chemical processing has solved some big problems in the past; this time it's zeroing in on human starvation—and it just might score.

Taming Spent Sulfite

A process designed to recover soda ash from spent sulfite liquor is now in commercial operation at Consolidated Water Power & Paper Co.'s Wisconsin Rapids, Wis., plant. Developed by Western Precipitation Co. (Los Angeles), the $750,000 recovery system (*CW Technology Newsletter, June 22, '57*), is said to make sodium-base sulfite pulping competitive with the traditional calcium-base route —and to give bonuses of high pressure steam and pollution control.

Consolidated has modified one digester in its 100-tons/day pulp mill to use the sodium-base method, will enlarge the recovery system to process spent liquor from the whole mill if results prove out.

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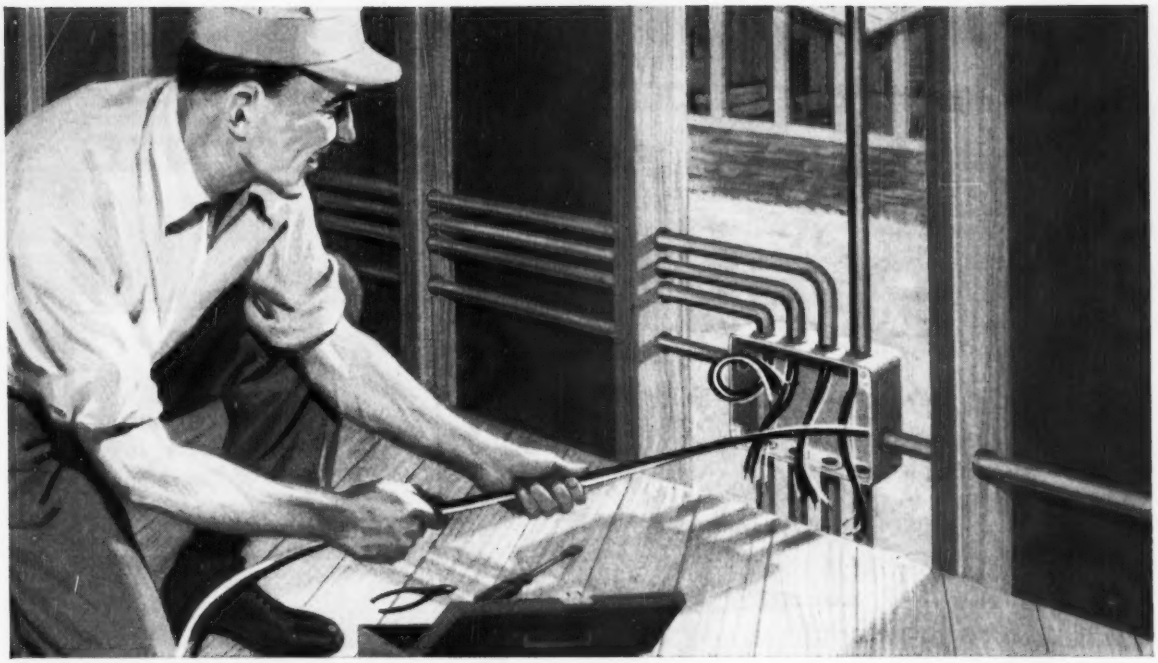

National Lead chemical research helps electrical industry gird for higher "housepower"

...with a stabilizer to lift by 15° C the rated temperature of building wire vinyl insulation

A "housepower" boom is in the making.

And the electrical industry is getting ready by developing a new vinyl insulation for 75°C building wire . . . an insulation stabilized to operate 15°C higher than today's 60°C general-use compounds.

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National Lead chemical research went to work on the problem with extensive tests of stabilizer-plasticizer combinations . . . found the lowest-cost answer to be its own Dythal® stabilizer. This finding is confirmed by leading wire makers.

National Lead Company works closely with the electrical industry to solve specific vinyl insulation problems. Work of this kind helped it to become the country's biggest producer of vinyl insulation stabilizers.

National Lead chemical research improves performance of vinyls, many other products

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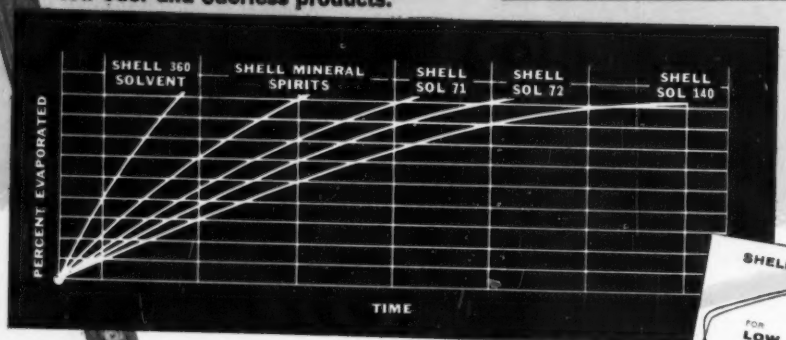

Typical properties of these Shell Solvents are contained in booklet shown. It will be mailed on request.

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SHELL

Technology
Newsletter

CHEMICAL WEEK
May 16, 1959

The Air Force confirmed that liquid hydrogen is being produced on a commercial scale. Before members of the Institute of Aeronautical Sciences and the Cadet Engineering Society at Colorado Springs this week, Lt. Gen. Bernard Schriever told of three plants now operating, described some of the engineering problems that have been solved and told of some of the hopes for liquid hydrogen as a fuel.

Plants. The existence of the three plants had been known for some time. One of the early plants was built by Air Products at Painesville, O. (*CW Technology Newsletter, Nov. 30, '57*). Another was built by Stearns-Roger at Bakersfield, Calif. (*CW Technology Newsletter, April 18*). The third, a "tonnage production" facility in Palm Beach County, Florida, was also built by Air Products. *CW* has pegged it as a 500,000-lbs./year plant in the "Cape Canaveral area" (*CW Technology Newsletter, Feb. 28*).

Air Products, said Schriever, has been operating the Florida unit successfully for several months.

Problems: In the early small plants, by-product hydrogen from chlorine cells or refinery operations was used as the starting material. In a large plant, the feed to a commercial ammonia synthesis unit was employed. These grades, however, were found unsatisfactory, making additional purification necessary. The liquid hydrogen now being produced is called "unquestionably the purest ever made."

The refrigeration problem (the temperature must be dropped to —460 F) was solved in Air Products' Florida plant by the use of "newly developed hydrogen turbo-expanders." The conversion of ortho hydrogen into the more stable para form has been the subject of research by many groups, notably the Bureau of Standards' Cryogenic Engineering Lab at Boulder, Colo.

The design of unique insulated (Thermos) containers made possible the long-distance hauling of liquid hydrogen. Such shipments are now described as "routine."

Hopes. Schriever, commander of the Air Force's Air Research and Development Command, said that the use of liquid hydrogen (fuel) with liquid oxygen (oxidizer) will give an increase of thrust, in relation to propellent used, of 40% over present combinations. He said it will make possible a new "high-energy plateau in chemical rocket-propulsion systems and vehicles."

The Air Force production facilities have been supplying liquid hydrogen for an upper-stage vehicle for the Centaur, a program of the Air Force and Advanced Research Projects Agency. They've also been supplying material for "several other important Air Force development activities."

Technology
Newsletter

(Continued)

Linde will have its liquid hydrogen pilot plant at Tonawanda, N.Y., ready this summer. It received a variance for an aboveground storage tank in the area to hold 1,800 gal. of liquid hydrogen. Eventually, it hopes to expand that to 4,000-gal. storage. Linde, of course, will build the big 10,000-lbs./day liquid hydrogen plant for the National Aeronautics and Space Administration (*CW Technology Newsletter, April 18*).

•

Strategic flexibility for supplying cellulose pulp to rayon and paper makers has been built into Buckeye Cellulose Corp.'s wood-pulp mill at Foley, Fla. Buckeye stresses that the new $20-million capacity-doubling process line now going onstream is strictly for paper pulp. The older line is now freed to run strictly on dissolving-pulp if necessary. Buckeye lists its major dissolving-pulp markets in this order: Tyrex tire cord (*CW, March 21, p. 87*), viscose rayon and cellophane.

Improvement in quality of dissolving-pulp from wood has, over the past few years, been one of the major factors in rayon tire-cord makers' ability to meet nylon-cord makers' price reductions and to keep rayon-cord costs well below that of nylon cord. Buckeye is the only producer of dissolving-pulp from both wood and cotton linters, has a 115,000-tons/year capacity linter mill at Memphis in addition to the 200,000-tons/year capacity wood mill at Foley.

Key to wood-pulp upgrading, according to Buckeye, is in bleaching process. The Foley mill uses 11-stage bleaching for dissolving-pulp, only seven stages for paper pulp. To make 1,100-denier yarn, dissolving-pulp from wood is now used, whereas a few years ago, it could be made only from linters. Regular purity is now 97.5% alpha cellulose, is fast approaching 98% and the best linter purity. Price of dissolving-pulp from wood is 50-90% of the price of material from linters.

•

Plutonium-239 is now being used to measure moisture content of molding sand at General Motors' Central Foundry Division plant in Danville, Ill. Thirty-two grams of plutonium mixed with beryllium powder are sealed in a stainless steel capsule, which is inserted into each 3,200-lb. batch of molding sand by means of a stainless steel tube. Slow neutrons, produced by collisions of fast neutrons from the pellet with hydrogen nuclei in water atoms, are electronically counted, activating a gauge, which indicates percent moisture. GM says the method, first AEC-authorized plutonium application of its kind, "has substantially improved our ability to make sand molds of uniformly high quality."

•

Esso Standard begins marketing its all-butyl automobile tire this week in 18 Eastern states and in the District of Columbia. It's called the Atlas Bucron tire, is said to feature quieter, smoother riding than conventional tires. Esso says it will stop an auto in one-third less distance, also resists ozone attack and does not squeal when stopping or rounding corners. More than a quarter-billion miles of test driving have proved the new tubeless tire satisfactory, the company reports. It has been under development for several years (*CW, Oct. 6, '56 p. 72*).

NEW *never before available*

SUMSTAR™

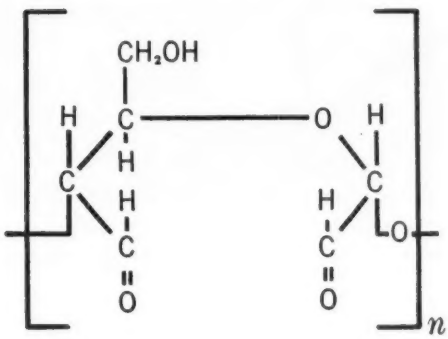
a polymeric dialdehyde

For the first time, a new polymeric dialdehyde, Dialdehyde Starch, is offered under the name SUMSTAR™ by Sumner Chemical Company.

Originally developed by the United States Department of Agriculture's Northern Utilization Research & Development Division, the process has been adapted for manufacture by Sumner.

Dialdehyde Starch is described as "cornstarch oxidized by periodate ion. Oxidation breaks the carbon-to-carbon bond between C_2 and C_3 of the starch molecule's glucose units, forming a dialdehyde unit. Any number of glucose units can be oxidized, depending on the properties wanted at the time." (Chem. & Eng. News, Dec. 9, 1957)

Following is the structural formula and the list of tentative specifications for SUMSTAR now being made in limited quantities. (The specifications will vary, of course, for specific grades and types of SUMSTAR.)



description: Free-flowing white to pale yellow powder

percent aldehyde content: As required (corrected for water)

currently available: 1. Over 90%
2. 75%-80%
3. 50%

water: Less than 10%

heavy metals: 20 ppm. maximum

sulfated ash: 1% maximum

The applications of this polymeric dialdehyde for industry appear to be almost unlimited. Many uses have already been evaluated and many others are in the process of evaluation. Here are some of the principal industrial applications which are being evaluated:

leather—tanning
textiles—crease resistance and waterproofing
plastics—new polymers
paper—increase in wet strength

The many areas in which applications research on SUMSTAR is under way cover as broad a range as the chemical industry itself. Here is, for example, a polymer with the functional groups of glyoxal. Evaluation of SUMSTAR as a photographic hardener, bacterial inhibitor in cutting oils, vulcanization retardant, coating for printing plates, etc., are a few suggested areas for product development and process modification with SUMSTAR.

SUMSTAR™ is now available in limited quantities. Samples are available upon request.

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6708-A

Specialties for travelers: (1) baby travel kit, (2) skin ointment, (3) insect repellent, (4) foot powder, (5) motion pills, (6) hand cream, (7) mouthwash, (8) deodorant, (9) shampoo. Additional travel specialties are shown on p. 102.

Cashing In on America's New Wanderlust

Titan Chemical Industries, Inc. (Denver) has just introduced a line of 3-oz. aerosol products for travelers. The company's travel specialties retail for 50¢, include such items as hand lotion, hair shampoo, baby lotion, hair spray and shave lather. Titan's move to small, easily packed products is the latest of moves by specialty makers to cash in on the growing travel market.

This year, more people than ever are traveling. They're going farther and, in many instances, are staying longer. Last year, Europe lured 677,000 Americans; this year, over 700,000. Americans traveling overseas this year (excluding Mexico and Canada) may number 1,550,000 up 10% over last year's record of 1,410,000 travelers to foreign shores. Also to be considered are the more than 90 million Americans who take trips within the U.S. each year.

The Subjective Sell: Selling travel specialties calls for a marketing approach different from that used for other products. It's especially important to keep certain factors in mind when going after this market:

- In many cases, people who are going abroad are first-time travelers who tend to take overstuffed suitcases, don't know what products are available at their destination. They're more inclined to stock up on items such as toothpaste, shampoo, detergents and shoe polishes.
- Many travelers are insecure. For one thing, they are afraid of health problems. This means that travelers are a prime market for products such as water-purification tablets, motion-sickness pills, insect repellents, heat tablets, various ointments for skin infection.
- In foreign countries, language as well as health problems can contribute to the traveler's feeling of insecurity. Even if products are available to him at his destination, he frequently doesn't know how to ask for them. So he buys countless pharmaceutical products before leaving home.
- Americans like to impress their overseas friends with new and unusual items. Packaging is usually the keynote here. Liquid soap in polyethylene bottles, compressed and scented face cloths packed in vinyl envelopes, special detergents for nylon garments packed in vinyl capsules, hand lotion in individual aluminum packets, instant wash-up towels—all are products that sell well to long-distance travelers as well as to the bon voyage gift-giver.

Who's Traveling: The business of selling specialty products packaged in travel kits, or products aimed solely at travelers, is pretty much a small-

company business. The larger soap and cosmetic companies think that the travel market volume is not yet big enough for them. Many large cosmetic and soap companies queried by *CW* said that promoting a product solely for travel use would limit the market too severely. These large companies feel that they already have a big share of the travel market without making a special travel promotion pitch or without packaging a product exclusive for travelers. According to Colgate-Palmolive, the bulk of its smaller-size units, particularly those products packed in unbreakable containers, are already being purchased by travelers.

Another drawback, say large companies with nationally advertised brandnames, is price. It costs more to package travel kits containing four or five products. Consumers would balk, of course, at paying $5 for a special pack, knowing they were getting only 79¢ worth of merchandise. A relatively unknown company can package unknown brandnames in a travel kit and charge a premium price. The consumer doesn't know what price he should pay for the items. There's no other similar product that enables him to make a price comparison.

What to Sell: The bulk of items now packaged for travel use are unique, somewhat gimmicky, products. In order to sell many of them, it's more important to merchandise the product concept rather than the product itself. The idea is all-important; the cost, even the product, is secondary. Here's a rundown of a few of the products now being marketed:

Laundry Soaps: Detergents and soaps for traveling are available in a variety of packages. Some companies marketing these products include Q. W. Laboratories (Plainfield, N.J.) and Matthew Products, Inc. (Irvington, N.J.). Both market laundry detergents in capsule form. Revlon sells Fine and Handy, a liquid soap in a polyethylene bottle for travel use. Cold-water soaps, such as Woolite by Honey Harbour of California, Inc. (North Hollywood, Calif.) and Tussy Jalma made by Lehn & Fink (Bloomfield, N.J.), are also packaged with the traveler in mind. Toilet soap packaged in aerosol containers is available from Angelique and Co., Inc. (Wilton, Conn.).

Cloths and Towels: Compressed and scented face cloths that expand into full-size face cloths when put into water are marketed by Q. W. Laboratories. Soaped towels—paper towels impregnated with a cleaning lotion—include Wash-'n-Dri, sold by R. R. Williams, Inc. (Canaan, Conn.), and Nice-Clean, marketed by Nice-Pak Products, Inc. (N.Y.).

Hand Lotion and Shampoo: Elizabeth Arden markets a purse-size hand lotion and hand soap in a polyethylene tube; W. O. Washburn and Sons, Inc. (St. Paul, Minn.) offers Argento hand lotion pillows — hand lotion packed in individual aluminum packets. Shampoos for travel include those in capsule form, dry shampoos in polyethylene bottles and concentrated liquids in polyethylene squeeze tubes, such as Procter & Gamble's Prell.

There are a host of other cosmetic products packaged for the traveler. Some of these items include deodorants, cologne and perfume, bath salts, toilet soaps, sun tan lotion, men's after-shave lotion, spray deodorant, shampoo, shave lather and preshave lotion. Shoe polish kits, such as Knomark Co.'s. (Brooklyn) Esquire Travel Kit, Johnson & Johnson's Baby Travel Kit, spot removers, foot powders and sprays, and first-aid kits, are all being pushed for a share of the traveler's dollar.

Pfizer markets Bonamine and Bonadettes for motion sickness, Union Carbide Chemicals Co. sells 6-12 insect repellent in polyethylene bottles, a number of companies push antacids, heat tablets, poison ivy remedies and various ointments, in unbreakable, small containers for the traveler.

Travelers want products in small, unbreakable packages: (1) hand lotion, (2) shampoo, (3) after-shave lotion, (4) cologne, (5) shoe polish, (6) soaped towels, (7) lotion and soap, (8) spotter, (9) bath oil, (10) sun tan lotion, (11) perfume.

Wallace & Tiernan, Inc., (Belleville, N.J.) sells Globaline tablets for water purification, is now working on individual Globaline packets.

Yet to Come: Developments that could offer travel specialty makers some unique new product ideas include National Cash Register Co.'s encapsulation technique. NCR's process involves enclosing microscopic droplets of liquid in gelatin capsules. Although NCR says that such travel specialties have not yet been developed it adds that products such as facial tissues that keep their scent until rubbed, and waterless soaps made by coating paper towels with a detergent, are a couple of possibilities.

Another product that specialty makers are watching is S. C. Johnson & Son, Inc.'s (Racine, Wis.) Porelon. It's a synthetic material (resin and binder) in which a liquid can be incorporated during manufacture. The liquid can then be given off at a predetermined rate. According to Johnson, any liquid that's now going into a bottle can go into Porelon and end up in solid form. Lipstick, antiperspirants and colognes are a few of the items Johnson is now working on. Other possibilities: shampoo, fingernail polish and remover and eye make-up.

Ivers-Lee Co. (Newark, N.J.) has a new packaging device, too: sealing fully saturated sponges inside individual foil packages. Product possibilities for travel specialties with the new Ivers-Lee development include spot cleaners and alcohol — designed for doctors and for traveling diabetics.

Where to Sell: Biggest problem in marketing travel specialties is in finding new outlets in which to sell. The bulk of travel specialties are sold through department stores. Next biggest retail outlet is drugstores. Few travel items are sold in terminal buildings, grocery stores, motels, hotels or through vending machines, camera stores or luggage shops. Premium price and uniqueness of many of the travel items make department stores the most important outlet, say specialty makers.

Retail outlets that are beginning to attract travel items include auto supply stores and filling stations. Johnson & Johnson will begin marketing its first-aid kits through auto supply stores this summer. Motels, too, are beginning to sell more travel items. Titan Chemical, for example, plans to market its new travel aerosols through motel chains. PX's at Army posts and other military posts also are selling a few travel specialties. Q. W. Laboratories is selling its travel products at Army posts.

Promotion and advertising in the travel specialty field is quite limited. Most promotion is done cooperatively with department stores. Tie-ins with airlines, railroads and large hotels are also popular promotion methods. R. R. Williams, for instance, says that airlines are not only good promoters for travel specialties but good customers as well. Williams markets its Wash-'n-Dri to over 54 scheduled airlines, including American, Trans World, Capital, and Pan American.

Another method of promoting the travel kit idea: a magazine's offering travel kits. One that has found this idea very successful is *Parents' Magazine*. Last year *Parents'* sold over 22,000 summer outing kits to its readers. They paid $1/kit, received a waterproof carrying case that contained over a dozen travel-size samples of products advertised in *Parents'*.

Advertising, to date, has been limited to newspaper ads and small ads in magazines such as the *New Yorker*, *Holiday* and *Vogue*. But as more and more companies go into the travel specialty field, advertising is sure to step up rapidly. Seaforth, division of Chesebrough-Pond's, Inc., plans an all-out ad program for its new Men's Travel Trio. Full-page color ads will go into the *Saturday Evening Post* and *This Week* magazine. Seaforth will tie in with Sabena Airlines, offer a free trip to Europe for the reader who writes the best jingle. Lentheric, division of Helene Curtis, will push its spillproof Vagabound cologne in a Vagabound-to-Hawaii promotion scheme. The June issue of *Holiday* is slated to come out with Lentheric's travel-cologne ad.

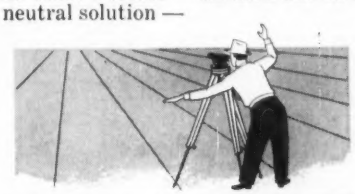
Just Beginning: Other factors to consider in developing specialty travel items: (1) a product developed for the travel field also can be aimed at the commuter — a girl may carry a small case of grooming aids in her purse for use at the office; (2) by packaging a number of products in a kit, specialty makers may get consumers to try a new or slow-moving product along with its best-selling line.

The travel boom is just beginning,

COLLOID CORNER

BLACK MAGIC!

Microscopic particles of carbon black have some fascinating powers. For instance, take the selective attraction for ions . . . the proper grade of colloidal carbon in a solution of ordinary salt will exchange hydrogen for the sodium ions . . . leaving the chlorine as HCl! Presto! — an acid out of a neutral solution —



SKIN DEEP... BUT SO MUCH SKIN!

Such ion exchange takes place only on the surfaces of the particles . . . but what surfaces! There are more than 8,000,000,000 particles in each letter of this sentence! Imagine the total surface area in a handful of colloidal carbon! It's best measured in acres! Such incredible surface areas can accommodate a lot of ions.

A LION WITH IONS

This characteristic . . . controllable by Columbian production methods . . . affects such things as adsorption of metals, of salts, of organic acids. It can affect the rate of cure of rubber compounds, the drying rate of paints. It may have new uses for improving your product. Find out—how . . . now!

COLUMBIAN CARBON COMPANY

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CHEMICAL...
IN THE WEST FOR
PHOSPHATES
and practical ideas!

Selling chemicals is our business, but helping people is our specialty. If you have problems that might be solved by using Sodium Phosphates, Chelating Agents or Phosphoric Acid, let's discuss the possibilities offered by the following:

Available for immediate delivery

- MONOSODIUM PHOSPHATE
- DISODIUM PHOSPHATE
- TRISODIUM PHOSPHATE
- TETRASODIUM PYROPHOSPHATE
- SODIUM ACID PYROPHOSPHATE
- DRI-TRI® (TSP ANHY.)
- ARMOFOS® (TRI-POLY)
- VITRAFOS® (GLASSY)
- CHLORINATED TSP
- POTASSIUM PHOSPHATES
- PHOSPHORIC ACIDS
- SODIUM CARBONATE
- SODIUM HYPOSULFITE
- ANHYDROUS HYPO
- SODIUM SULFITE
- ACETIC ACID
- QUESTEX® (EDTA)

Let's talk about your operations. Perhaps we can help.

A. R. MAAS CHEMICAL CO.
Division of Victor Chemical Works
4570 Ardine Street, South Gate, California

PLANTS:
South Gate and Richmond, California

and, with population increase, more discretionary spending power and a three-day weekend almost a future certainty, it's a field well worth looking at. Specialty makers may go far by pointing products directly at the travel market.

$1.5 Billion Beauty Bill

Retail business in perfumes, cosmetics and other toilet preparations (excluding toilet soaps) in '58 amounted to $1.52 billion, according to The Toilet Goods Assn.'s latest survey. Business was up 6.5% over '57, a record year. Other findings:

Dentifrices increased by 12%, shaving creams went up 2% and sales of perfumes were up slightly. Gains were also registered by lipsticks, hair colorants, cake powders and men's colognes; declines were evident in sales of hair permanent kits, and loose face powder products.

Food stores continued to grab a bigger share (22.3%) of the business. Total sales by drugstores (27.1%) declined percentage-wise, as did sales (19.2%) through department stores. Door-to-door selling increased slightly (20% of the market), as did variety store sales (7.9%), limited-price variety stores, 11% of total sales (up 1%), and other outlets, 4.9% of all sales (up 1.1%).

Over the last decade, the industry has doubled retail sales. In '48, sales were $749.8 million. They topped $1 billion for the first time in '52 and were $1.4 billion in '57.

Genie Hassle

Jay S. Conley and Co. (Mountain View, Calif.), manufacturer of a line of chemical specialties and home maintenance aids, has filed suit in U.S. district court in San Francisco against Colgate-Palmolive. The company is charging trademark infringement and unfair competition. The charges are based on Colgate's use of "Genie" as a trademark for its household liquid detergent. The complaint alleges that Conley has used its trademark "Jeenie" and a genie figure as a trademark for its line of chemical products for many years. In addition, the complaint asserts that Conley advertised the slogan "Jeenie can do" and that Colgate-Palmolive has copied this too.

Odorless Deodorant

National Cylinder Gas Division of Chematron Corp. (Chicago) has begun marketing an odorless deodorant. The material (a quaternary ammonium compound) is said to control residual odors in fish markets, food packing, processing plants, etc., without masking or paralyzing sense of smell.

Hospitals have been testing the material for washing and disinfecting dishes, utensils and garments. It is nontoxic; can be applied directly as a spray on odor-producing cancer and gangrenous body areas; inhibits the growth of moulds and mildew. NCG supplies the deodorant (an amber-colored liquid) in aerosol or concentrated form. Prices of the concentrate (diluted 9:1): $330/55-gal. drum; $17.08/gal.; $4.50/qt. A 7-oz. aerosol is 90¢.

The so-far-unnamed deodorant is manufactured and sold to industrial users by The Medical Gas Division of McGraw-Edison Co. (Stuyvesant Falls, N.Y.). While there's no consumer counterpart of the product, success in the industrial field will doubtless lead to a product to be sold in retail outlets.

PRODUCTS

Germ-Killing Floor Wax: A liquid floor wax, said to reduce by 91-98% the number of bacteria on floor surfaces, has been developed by Penetone Co. (74 Hudson Ave., Tenafly, N. J.). The product, called Demon, is a carnauba-type wax, sells for $3.25/gal. in 55-gal. drums. A derivative of Bithionol (a thio-bis-dichlorophenol) gives the wax its germ-killing ability, which is said to be effective as long as the wax is on the floor.

•

Adds Rust Inhibitor: Halocarbon Products (Hackensack, N. J.) is now offering polychlorotrifluoroethylene grease with a rust inhibitor (zinc chromate). The company is also offering its greases in milled form for the first time. The greases containing the rust inhibitor are designated 25-10M and 25-20M. The milled products are 25-10MZ and 25-20MZ. All are available in 2-lb. polyethylene bags as well as in conventional containers in multiples of 1 lb.

•

Fungus-Fighting Sleeving: Borden Chemical Co. (New York) has devel-

oped a transparent, fungus-resistant vinyl insulation sleeving. Tradenamed Resinite EP-69C, the new material conforms to requirement of Navy Specifications MIL-I-631C, grades A and B, for electrical insulation applications. It has low-temperature flexibility to —75 F., high-temperature stability to 185 F.

•

Key to Epoxy Use: Fybrglas Industries (3010 Montrose Ave., Chicago) is offering its two-component epoxy solder in a new dispensing form. It packages the two components in twin collapsible tubes, has a key affixed across the bottom of both. Turning the key discharges equal quantities of each component simultaneously. The product is tradenamed TwinWeld.

•

Glows to Show You: Magic-Glow Chemical Corp (166 W. Washington St., Chicago) has developed an invisible marking ink for identifying liner paper and board. It's called Blanclite, glows when put under black light.

•

Wrap-up for Food Packagers: The National Academy of Sciences, National Research Council (2101 Constitution Ave., Washington, D. C.), has issued a 48-page booklet (publication 645) of interest to chemicals used in making food packaging materials. The title, which describes the contents, is "Food-Packaging Materials — Their Composition and Uses." Pirce: $1.

•

Antibacterial Textile Finish: A textile finish, said to be "99.9% successful" against staphylococcus, has been developed by Ions Exchange & Chemical Corp. (48 Leonard St., New York). The treatment, called Eversan, is basically an organic zinc compound made to adhere to the fibers of a fabric, is said to give protection for the life of a garment (it will withstand more than 60 washings without losing effectiveness, according to the maker).

Cost of the treatment is estimated at 4¢/lb. of fabric, if all additive is picked up by the cloth from the solution. Eversan sells for 80¢/lb., needs no special application equipment. London Hosiery (New York) is using the product commercially now; others are testing it.

Still in the development stage at Ions Exchange is a consumer antibacterial treatment for laundering.

LOOK CLOSER!

The orifice is tapered, not the tube

New C-Mar Series 5000 Flow Meter Employs Unique TAPOR-FLO* Principle.

This C-Mar Series 5000 area meter differs from conventional "rotameters" in many important ways. Area of opening for flow is varied by an accurately cut and tapered *orifice*, rather than a tapered *tube*. Result: simplified design, easier installation and maintenance, and a number of operating advantages *at no increase in cost.*

True Even Graduations. Exact linear relationship between float movement and flow rate *over entire scale.* Gives true linear output signal with electric transmitter.

"Quick-Out" Flow Tube. To clean or replace flow tube, simply unscrew bottom adapter and pull out flow tube—in a matter of seconds! No need to remove meter from line.

High Stability of Float. Float lines out quickly for reading when flow changes occur. Cycling or "bobbing" is minimized.

Accurate Measurement of Low Flows. Measures flows from 0.0001 to 30 gpm of water (0.0001 to 90 scfm air) with excellent reproducibility of flow readings.

New Series 5000 TAPOR-FLO Meter with Lucite safety shield. Meter has only 12 basic parts, with all identical parts completely interchangeable.

Meter Size	Conn. Size	Steel
250	¼"	41.00
500	½"	57.00
750	¾"	68.00
1000	1 "	74.00
1500	1½"	103.00

Available in most materials

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Write for Bulletin 5010. Get full specifications on this completely new meter, including O-ring seals and versatile end fitting design for vertical or side pipe connection. Also covers OPTIONS, such as materials, magnetic read-out, transmission, and tripod mounting.

C-MAR Corporation
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THE MAN WITH THE ★ MULTIWALL PLAN

UNION
PACKAGING SPECIALIST
DON DEININGER

saves Multiwall user $8 per M through specifications review

A Chemical Company, already using 43 different sizes and types of Multiwalls, planned to add new products to its line. Union Packaging Specialist Don Deininger recommended a simplification of Multiwall specifications and inventory. Union prepared a Specifications Manual for the manufacturer, also simplified, unified and modernized his bag designs.

Union Multiwall Recommendations are based on this 5-point Packaging Efficiency Plan

- DESIGN
- EQUIPMENT
- CONSTRUCTION
- SPECIFICATION CONTROL
- PLANT SURVEY

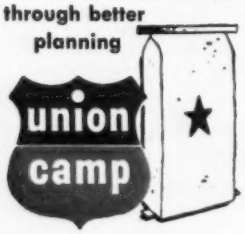
Results: user reported: (1) Union's recommendations for re-designing bag sizes and constructions in some instances saved as much as $8 per M.

(2) The new Specifications book enabled the customer to order bags more easily and accurately. It also simplified his inventory control.

(3) The new designs established a visual relationship between his family of products, enabled his sales force to do a better merchandising job.

This is a typical example of Union's 5-Point Multiwall Plan in action. Perhaps it can produce gains in your own Multiwall packaging operation. Write for additional information.

Better Multiwall performance through better planning



UNION'S PACKAGE ENGINEERING DEPARTMENT will study your Multiwall bagging methods and equipment and make appropriate recommendations, regardless of the brand of Multiwalls you are now using.

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UNION BAG - CAMP PAPER CORPORATION
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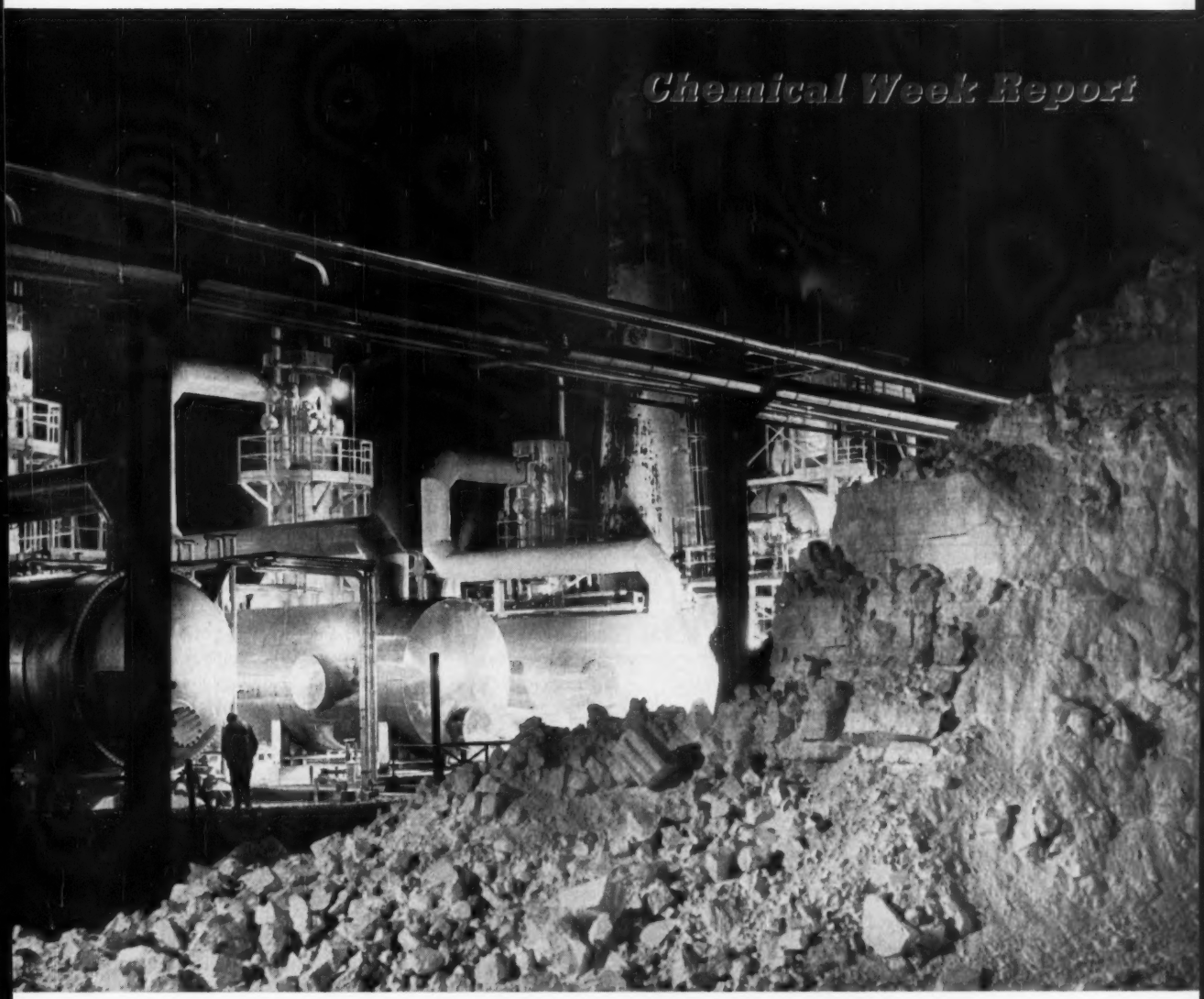


Sulfur recovery at Lacq, France, epitomizes the growing importance of new producers, who are . . .

CHANGING WORLD SULFUR BALANCE

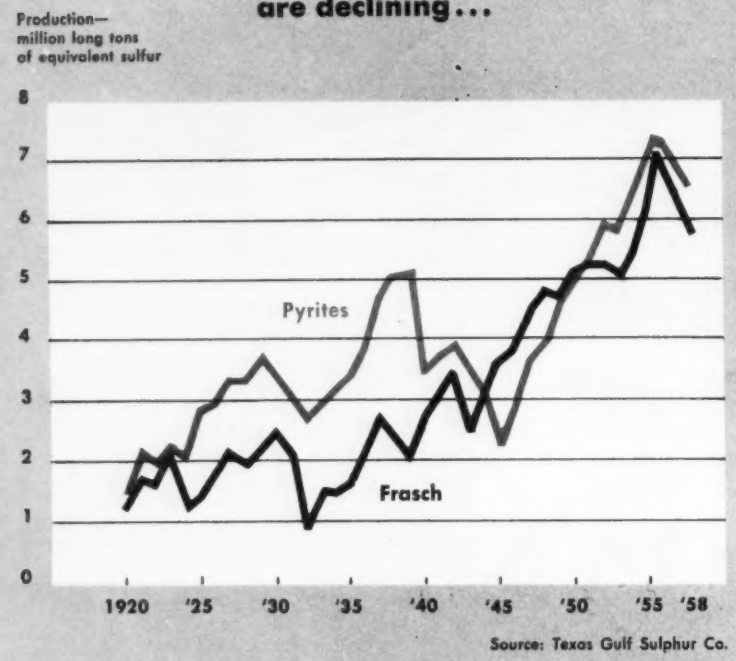
by Williams Haynes

Canada, France and Mexico are assuming bigger roles in sulfur production, nibbling at U.S. supremacy. Also changing the outlook: new sulfur sources; new markets; new acid-making processes.

Sulfur Production Patterns—

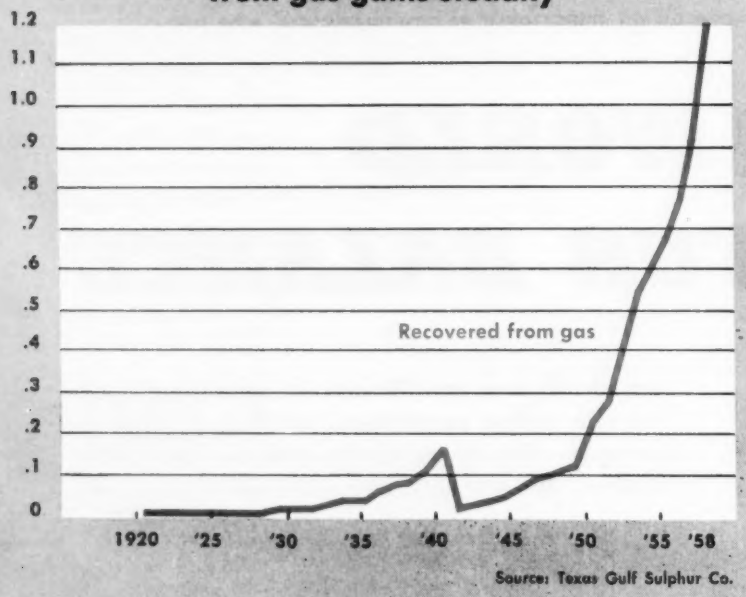
WORLD

Frasch and pyrites sulfur are declining...



Source: Texas Gulf Sulphur Co.

While sulfur recovered from gas gains steadily



Source: Texas Gulf Sulphur Co.

During 1959, world sulfur supply will have increased by roughly 750,000 long tons. Most of this new production is not U.S. Frasch sulfur but, rather, elemental sulfur recovered from Canadian and French sour gas.

Next year the output of the partly government-owned French company Societe Nationale des Petroles d'Aquitaine (S.N.P.A.) will approximately double ('60 total: 650,000 tons). In Canada, two new sulfur recovery plants are under construction; five others are in the blueprint stage. If all seven Canadian plants come onstream as planned, Canada's sulfur-producing capacity will grow by 595,650 tons/year. Canadian output in '60 will total 880,000 tons.

World sulfur consumption last year was an estimated 7.713 million long tons. Eugene Walet, Jr., president of Jefferson Lake Sulphur Co., believes it will be 24 million long tons by '65.

Industry observers expect the biggest increase in sulfur consumption to come from growing fertilizer and pesticide demand; spurring the growth of these products is the world need to boost food supply. No doubt, new uses for sulfur will continue to appear. Latest example: use of sulfuric acid in leaching uranium from ores.

While Frasch-process plants in the U.S. and Mexico still contribute the lion's share (5.766 million tons) of the total, the U.S. share of world production is shrinking.

In 1954, for example, the U.S. accounted for about 85.6% of world sulfur production; Mexico, 1.5%; Canada, 0.3%; France, 0.1%; others; 12.5%. By last year, the pattern had shifted in favor of Mexico, Canada and France, as follows: U.S., 66.6%; Mexico, 15.8%; Canada, 2.5%; France, 1.7%; others, 13.4%

These facts mean that the world market for sulfur is breaking into geographic areas bounded by freight rates. They indicate, too, that competition will no longer be confined to a handful of U.S. and Mexican Frasch sulfur producers, but will become entirely international.

Last year, the sulfur market was saturated. By the end of this year, it will be definitely oversupplied. How long this condition will last and how large the surplus will be are anyone's

In North America and the World

guesses. Yet, over the long term, the worldwide prospects for sulfur are optimistic, though the industry faces a period of commercial and technological change—no novelty to sulfur producers. Ever since John Roebuck built the first lead-chamber sulfuric acid plant two centuries ago, the sulfur *status quo* has been upset time after time by new raw material sources, improved acid-making processes and shifting demand.

SOME BASICS FIRST

Sulfur producers live with four basic facts of their business:

1. Sulfur is cheap. No other volume chemical can be bought in virtually C. P. grade for less than 2¢/lb. During the past 25 years, sulfur prices have risen only 30%; while tin has advanced 140%; zinc, almost 150%; petroleum, more than 200%; lead, 235%; copper, nearly 250%.

As Langbourne Williams, chairman of Freeport Sulphur, points out: the 30% sulfur price rise is out of step with increased sulfur production costs—average hourly wages, up 330%; pipe, up 180%; fuel gas, up over 200%; higher federal, state and local taxes.

2. Producers have almost no control over demand. Sulfur is a raw material in a multitude of industries, which buy no more or less than what they need to feed their production operations. A lower price may tempt a buyer to switch from one supplier to another; it will never induce him to increase his consumption by a single ton more than he needs. Nor can the sulfur producer employ sales "gimmicks" to widen his market. He can't add "miracle ingredients" nor can he increase the appeal of his product's package. In short, there is no impulse buying of sulfur. Sulfur demand is remarkably stable and increases steadily.

3. Sulfur can be stored indefinitely without appreciable loss of weight or deterioration. No sulfur will be thrown out in order to preclude spoilage. On the other hand, a mounting stockpile is by no means ruinous if the producer has the courage and financial strength to carry a heavy load of frozen assets. Demand always catches up as industries expand sulfur requirements.

4. Worldwide, the big sulfur mar-

N. AMERICA

Breakdown of 1958 Frasch production in the U.S. and Mexico

(long tons)

Company and Mine	Production
Texas Gulf Sulphur	
Boling, Tex.	1,226,059
Spindletop, Tex.	370,215
Moss Bluff, Tex.	330,902
Long Point, Tex.[1]	104,829
Nopalapa, Mex.	115,000
Fannett, Tex.[2]	195,511
	1958 Total: 2,342,516
	1957 Total: 3,077,731
Freeport Sulphur	
Grande Ecaille, La.	1,071,000
Garden Island Bay, La.	530,000
Bay Ste. Elaine, La.	162,000
Chacahoula, La.	202,000
Grande Isle[3]	———
Lake Pelto, La.[4]	———
	1958 Total: 1,965,000
	1957 Total: 2,036,885
Pan American Sulphur	
Jaltipan, Mex.	**1958 Total: 821,989**
	1957 Total: 723,170
Jefferson Lake Sulphur	
Long Point, Tex.	104,246
Clemens, Tex.	99,549
Starks, La.	90,241
	1958 Total: 294,036
	1957 Total: 310,249
Gulf Sulphur	
Amezquite, Mex.	**1958 Total: 263,000**
	1957 Total: 191,888
Duval Sulphur & Potash	
Orchard, Tex.	**1958 Total: N.A.**
	1957 Total: 153,170
Mexican Gulf Sulphur[5]	
San Cristobal, Mex.	**1957 Total: 1,632**
Standard Sulphur[5]	
Damon, Tex.	**1957 Total: 5,359**

[1]Produced for TGS by Jefferson Lake Sulphur.

[2]New in '58.

[3]Offshore installation under construction seven miles due south of New Orleans, La.; will be producing early in '60.

[4]Company developing new mine; no onstream date given.

[5]Operations abandoned.

1944-58 cumulative U.S. sulfur recovered from hydrogen sulfide

(thousand long tons)

	% Total	Production
55 non-sulfur-producing companies	76.8	2,984
Texas Gulf Sulphur	18.7	725
Jefferson Lake Sulphur*	3.2	123
Freeport Sulphur	1.3	52
Total	100.0	3,884

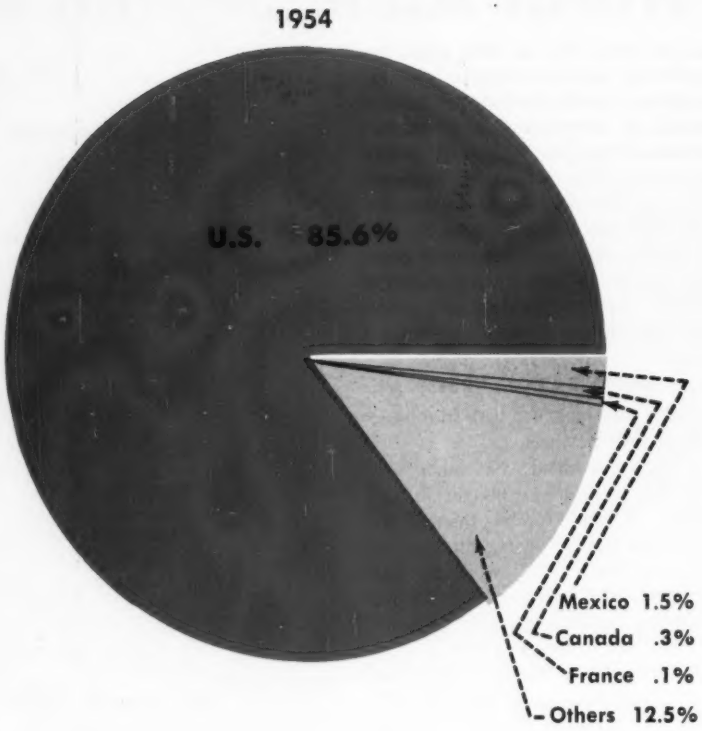
*Includes production in Canada

ket is in sulfuric acid manufacture. Sulfuric acid consumption corresponds closely to industrial production. While the U.S. is by far the largest consumer of sulfuric acid (about 16 million tons in 1958), demand promises to grow faster in other countries. Populations are growing more rapidly elsewhere; industry is expanding faster in underdeveloped countries.

Frasch and pyrites producers have traditionally fought a pitched battle for the favor of sulfuric acid makers. But now producers of recovered sulfur are also vying for sulfuric acid business. It is hard to imagine that any new sulfuric acid plant will be based on pyrites as a source material; and the market for Frasch and recovered sulfur will likely increase further at the expense of pyrites.

In 1958, sulfuric acid production in the U.S. was divided among the various primary sulfur sources as follows: elemental sulfur, 71%; pyrites, 12%; sulfur from by-product smelter gases, 9%; sulfur from acid sludge, 6%; sulfur from hydrogen sulfide gas, 2%. By contrast, in 1950 elemental sulfur was used for 79% of all the sulfuric acid produced; pyrites, 13%.

How U.S. share of world



World production (elemental sulfur) **6.94 million long tons**

Source: Chemical Engineering

SOUR GAS COMPETITION

Recovery of elemental sulfur from sour gas is, by far, the most significant facet in today's changing sulfur picture. Two points are vital to an understanding of this increasingly important competitive factor:

1. Sour gas, like gold, is where you find it. And no sulfur will be recovered from it until a market for the sweetened pipeline gas is established. Demand for sweetened gas will not develop if sweetened natural gas is available from other sources in sufficient supply to meet consumer needs. Pipelines are expensive; they are profitable only on a long-term basis and for a sizable industrial load that's continuous for 24 hours a day, 365 days a year.

2. Sulfur recovery is a by-product operation. Production will be governed not only by gas demand but also by the amount of hydrogen sulfide in the untreated gas. As is so often the case, the costs of an obligatory by-product may be largely a matter of bookkeeping.

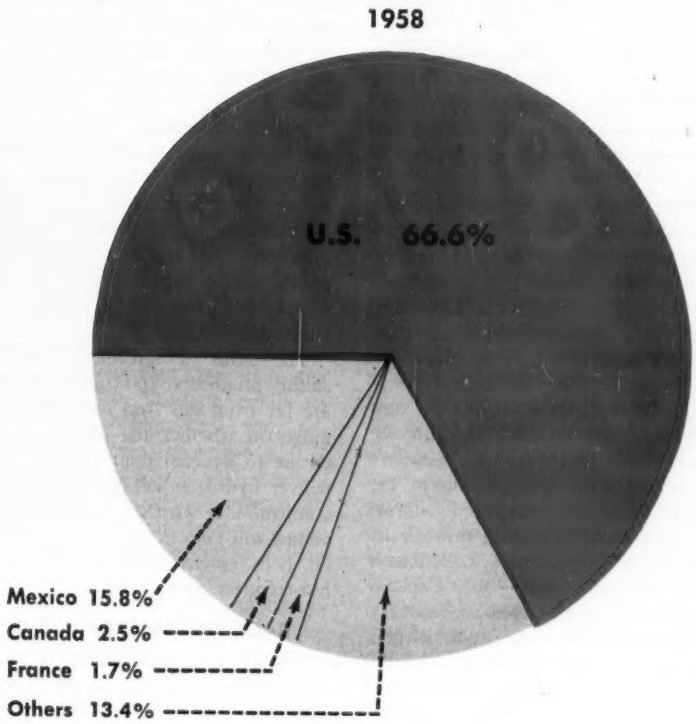
Pioneering of hydrocarbon-gas sweetening began in the early '40s. Texas Gulf and Southern Acid & Sulphur Co. simultaneously built pilot plants for sulfur recovery in the Arkansas gas field. Sour gas from this region was cleaned and concentrated in a water solution of monoethanolamine, dehydrated (in a solution of amines and glycols) to an average of 58% hydrogen sulfide, 41% carbon dioxide, and 1% mixed hydrocarbons. Conversion of hydrogen sulfide into sulfur was by the old Claus method: carbonizing the calcium sulfide with carbon dioxide, and oxidizing the resulting hydrogen sulfide over a ferric oxide catalyst to elemental sulfur vapor.

Following this experimental work, Southern Acid (now part of Olin Mathieson) built a 120-tons/day plant at McKamie in 1944 and a second plant two years later at Magnolia. In 1949, Texas Gulf built its plant at Worland, Wyo. Capacity: 400 tons/day of recovered sulfur. For years, it was the largest plant of its kind in North America.

Since these early beginnings, the Claus process has been modified by: (1) using bauxite or alumina as a catalyst; (2) burning some of the hydrogen sulfide gas to sulfur dioxide and mixing the latter with the original feed gas; (3) carrying on the oxidation process in two stages. Absorbents other than the ethanolamines (Girbotol process) have been introduced: potassium phosphate (Shell process); sodium phenolate or sodium carbonate (Koppers process) and sodium thioarsenate (Thylox process).

By 1950, six recovery plants were operating: Freeport Sulphur, at Eagle Point, N.J.; Hancock Chemical, near Los Angeles; Olin Mathieson, at McKamie and Magnolia, Ark.; Stanolind, at Elk Basin, Wyo. and Texas Gulf,

production is slipping



World production (elemental sulfur) **7.90 million long tons**

at Worland, Wyo. Production of recovered sulfur rose from 3,942 long tons in 1940 to 510, 511 long tons in 1957, when some 45 plants were operating and half a dozen others were in the blueprint stage. In 1958, 619,594 long tons of sulfur were recovered from sour gas.

Throughout the plains flanking the eastern slope of the Rockies from Alaska to Mexico are enormous reserves of sour gas. In west Texas and Wyoming, alone, potential sulfur production of 400-500 tons/day, respectively, is possible for the next 25 years. But U.S. known gas reserves are small compared with those of northwestern Canada.

FRENETIC CANADIAN ACTIVITY

In 1954, Canada contributed about 0.3% of the world's sulfur production. Last year, its share had grown to 2.5%. At the end of 1958, six Canadian recovery plants were producing sulfur at the rate of 290,000 long tons/year. Oldest and largest is British American Oil's Pincher Creek plant, south of Calgary. It came onstream in '56 with 225-tons/day capacity; second stage was completed in October of last year, raising BAO's capacity to 750 tons/day, with actual production of the plant estimated at 450 tons/day.

Shell's plant at Jumping Pound, which up to this year had produced some 100,000 tons of sulfur, has a capacity of 100 tons/day; it is producing at a rate of 75 tons/day. Imperial Oil, at Redwater, and Royalite, at Turner Valley, are rated at 10 and 40 tons/day, respectively. These four plants are in Alberta.

At Taylor Flats, B.C., Jefferson Lake Petrochemicals of Canada operates a plant designed to process 425 tons/day of sulfur from the Peace River sour gas area. At Steelmans, Sask., Provo Gas Producers recovers 40 long tons/day of sulfur.

Seven additional plants are scheduled to come onstream this year. At Okotoks, Alta., Texas Gulf will complete its 350-long-tons/day plant this June. Also slated for summer production are Standard Oil of California, in the Home Glenrimbey field (190 long tons/day); British American and Standard Oil of California, at Nevis (100 and 65 long tons/day, respectively). Late in 1959, possibly not until early 1960, a 150-long-tons/day plant will be brought in by either British American or Standard Oil of California at Dick Lake. Both companies are active in this field.

The largest sulfur-recovery projects scheduled for '59 are two Jefferson Lake ventures a 320-350-long-tons/day installation at Savannah Creek or Coleman, and a 900-tons/day plant at East Calgary.

If all these new enterprises materialize as planned, Canada's recovered sulfur capacity will increase by 1,805 tons/day. This would increase the Canadian annual capacity to 595,605 long tons, bringing Canada's capacity to roughly 885,000 long tons in '60.

Due for development are big gas fields that await the allocation of gas for export. These plans are tentative; announced capacities are approximate. If plans materialize, the total resulting output—2,600 long tons/day—would bring '60 capacity up to 1.744 million long tons/year.

These "iffy" projects are Imperial Oil's, at Joffre (200 tons/day); Canadian Oil's, at Innisville (200 long-tons/day); Shell and/or Hudson's Bay Oil & Gas's, at Olds (100 long-tons/day minimum); Mobile and/or British American's, at Wimborne (100 long-tons/day). Pan American (Stanolind), Hudson's Bay and Canadian Fina (Belgium owned) are reported to be drafting a joint proposal to all the sulfur companies for a 2,000-tons/day recovery plant to be located in the Edson area. This section, 120 miles northwest of Edmonton, comprises three fields: Pine Creek, Beaver Creek and Windfall.

To date, Canadian sulfur has largely been consumed near sulfur-producing areas. But the local market is limited; any increased output will stem from exports. Since the producing area is

landlocked—600 miles to the Pacific, 1,200 miles to the Great Lakes—freight rates will be critical costs for Canadian sulfur producers.

The going rate from Alberta to Vancouver is 44¢/cwt. or $9.58/long ton. This is lower than the all-rail rate of $14.78 from Worland, Wyo., the nearest U.S. production point to the Northwest pulp and paper market. But freight rates put Canadian sulfur at a competitive handicap compared with sulfur at U.S. Gulf ports or Coatzacoalcos, Mexico (for export to the Far East).

Since sulfur is a big-tonnage commodity, it might be classified with other such commodities—wheat, for example. By agreement between the Canadian Pacific Railway and the Dominion government, the freight rate in perpetuity (unless abrogated by an act of Parliament) on wheat for export to Pacific ports and the head of the Great Lakes is 20¢/cwt. and 26¢/cwt., respectively. Wheat for domestic consumption, not subject to this agreement, is 54¢/cwt. to the West Coast or to the Lakes. The railroads might put sulfur on the domestic grain rate in order to give them much needed year-round traffic.

Canadian producers are eyeing a pipeline as an answer to the delivery cost problem. They are studying the feasibility of liquefying hydrogen sulfide and piping it to consuming centers. The elemental sulfur would then be recovered by modifications of the conventional Claus process. Principal problems to be solved first: corrosion and toxicity.

Operating costs and obsolescence favor Frasch installations. Drilling costs are less in sour-gas operations. U.S. experience indicates that the two processes are roughly comparable in cost.

More important, perhaps, than cost comparisons is how Canadian recovered sulfur will be sold and by whom. Two old-line U.S. companies, Texas Gulf and Jefferson Lake Sulphur, have already moved into Canada. Freeport and Pan American have observers in the field.

Its big Worland plant and the new one under construction at Okotoks, are evidence that Texas Gulf doesn't intend to be caught napping in the development of recovered sulfur. Jefferson Lake, operating through its 69%-owned subsidiary, Jefferson Lake Petrochemicals of Canada, brought its British Columbia recovery plant onstream in 1958, made its first carload shipment to Pacific Northwest paper mills the following July.

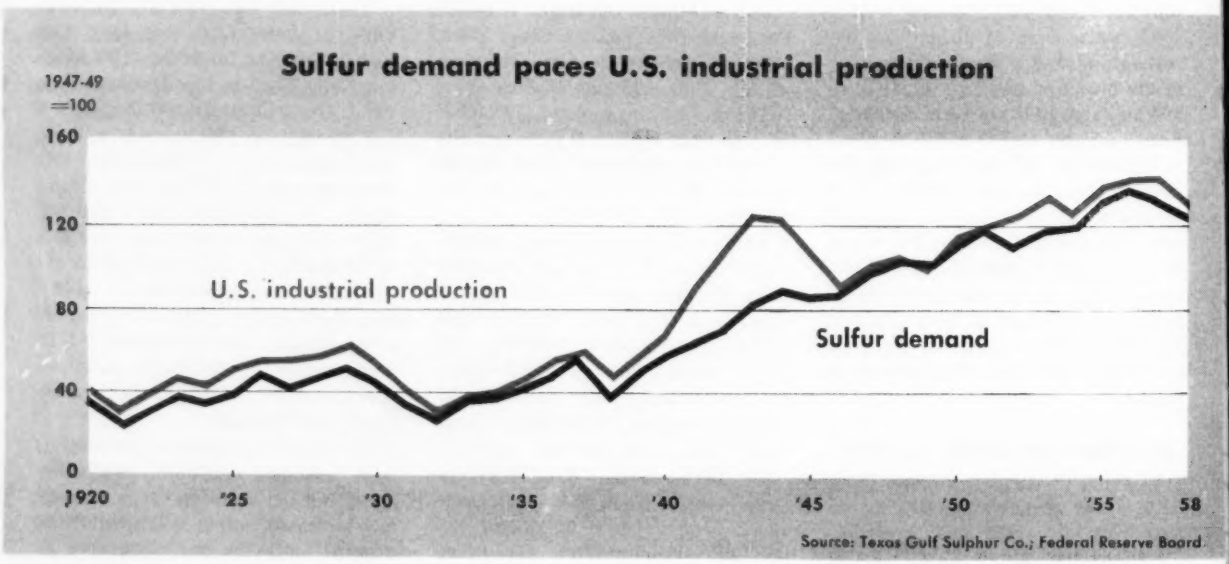
Jefferson Lake's plant has first call on the hydrogen sulfide extracted by Westcoast Transmission from gas collected in the Peace River area. The Jefferson Lake subsidiary also has leaseholds on some 80,000 acres in the Calgary area and a conditional agreement with Westcoast Transmission to sweeten all the latter's Savannah Creek sour gas; sweetened gas will go into a proposed pipeline to the Idaho boundry. The new plants at East Calgary and Savannah Creek or Coleman are based on these reserves.

Another proposed sulfur-recovery marketing setup is offered by International Sulphur Co. of Canada, subsidiary of Continental Ore Corp. International would finance small gas producers by building 50-tons/day plants, taking sulfur, condensate and liquefiable gases in exchange for sweetened pipeline gas.

The terms of agreements between sulfur producers and oil companies are far from set. And new deals will hinge on whether the oil companies decide to sweeten their own gas and deliver hydrogen sulfide to the sulfur companies, or whether the sulfur companies will take in raw gas and carry on both amine-separation and catalyst-recovery operations.

BACKING CANADA'S BID

Oilmen in northwestern Canada would rather find oil than gas; they wish the gas they discovered was sweet. Many, especially management of the large companies, aren't keen to enter the sulfur business. Already, they have made huge investments and begrudge assigning capital and personnel to sulfur recovery, when there's still much exploring and developing



to be done. First and last, they're oilmen. Accordingly, they're more than willing to let established sulfur producers clean the gas and market the recovered by-products.

But like it or not, Canadian oilmen possess the world's most prolific potential supply of sulfur. The first official estimates, made in 1947 by the Dominion Geological Survey, pegged proved reserves at about 1.4 trillion cu.ft. of natural gas, with a probable additional 2.2 trillion cu.ft.

In 1958, the Alberta Gas & Oil Conservation Board established reserves in that province alone at 22.5 trillion cu.ft. And this estimate does not include the recent sensational find at Berland River. The latter comprises 550 ft. of pay limestone with potential open flow of 1.5 billion cu.ft./-day of 16% hydrogen sulfide gas—the biggest field yet discovered in Canada, one of the biggest in the world. Reserves might be 10 trillion cu.ft., or more.

Western Canada's sedimentary basin contains some 789,000 cu. miles of sediments, 1,000 ft. thick, or more, considered favorable for discovery of hydrocarbons. The basin's ultimate recoverable reserve is estimated at over 250 trillion cu.ft. of natural gas. Two-fifths of the area is inaccessible today.

In the more easterly plains region, the gas is generally sweet and dry. It becomes more sour and wet in the foothills approaching the mountains. The hydrogen sulfide content of the sour gas goes as high as 50%-plus, averages about 15%.

At Panther River, 60 miles northwest of Calgary, Shell found one well containing gas rated at 81% hydrogen sulfide and less than 5% hydrocarbons. After a 14-hour test, the well was capped. It isn't known for sure whether this well is a freak or evidence of a sulfur deposit. Previous high for Canadian hydrogen sulfide gas was 45.72%, at Beddington, and 40.66%, at Wimborne.

Wide variations in the hydrogen sulfide content of Canadian gas result in some startling comparative sulfur-to-gas values. Because the wet gases also yield varying values of condensate (readily marketable for gasoline blending) and liquefiable petroleum gases (propane and butane for which a petrochemical market in Canada is growing), it has been suggested that sulfur recovered from gas containing less than 10% hydrogen sulfide should be properly classified as "by-product" sulfur; from 10-20%, as "co-product" sulfur; from gas containing over 20% hydrogen sulfide, as "main product" sulfur.

If Canadian control agencies adopt this classification as a guide in allocating gas reserves for development and export, a more orderly economic exploitation of these valuable natural resources will result.

For many reasons, the pipelines needed to exploit these great gas reserves have been delayed. Up to this year, only two long lines had been laid. One is Westcoast Transmission's 650-mile, 30-in. pipe (initial capacity: 400 million cu.ft./day) from the Peace River area, via Vancouver, to the U.S.-Canadian boundary. At its Canadian terminus, it joins the Pacific Northwest line to Washington and Oregon. The other is Trans-Canada's 34-inch pipe from the Alberta-Saskatchewan boundary to the head of the Great Lakes; this line is scheduled to reach Toronto and Montreal in 1960 and, eventually, Quebec.

The Alberta government has just approved two gas export applications: (1) from Westcoast Transmission for 0.8 trillion cu.ft. of Savannah Creek-Calgary sour gas to be piped through Crowsnest Pass to the Idaho boundary; and (2) from Alberta & Southern Gas (subsidiary of Pacific Gas & Electric, San Francisco) for 2.3 trillion cu.ft. of southwestern Alberta sour gas to be piped to Idaho boundary for distribution in Montana and California. Both contracts are effective for 17 years.

The next step is approval by the Ottawa government and consent of the U.S. Federal Power Commission. On both sides of the border, government attitudes incline toward development of these resources on a mutual basis.

Big markets for northwest Canadian gas are in the offing in eastern Canada and in U.S. Western states. The size of these markets and how quickly they will materialize is not predictable. But the demand will be filled largely by sweetened sour gas and, by 1961, the output of recovered sulfur from this source may reach 1 million long tons; by 1965, 2 million; by 1970, 2.5 million.

FRANCE MOVES UP

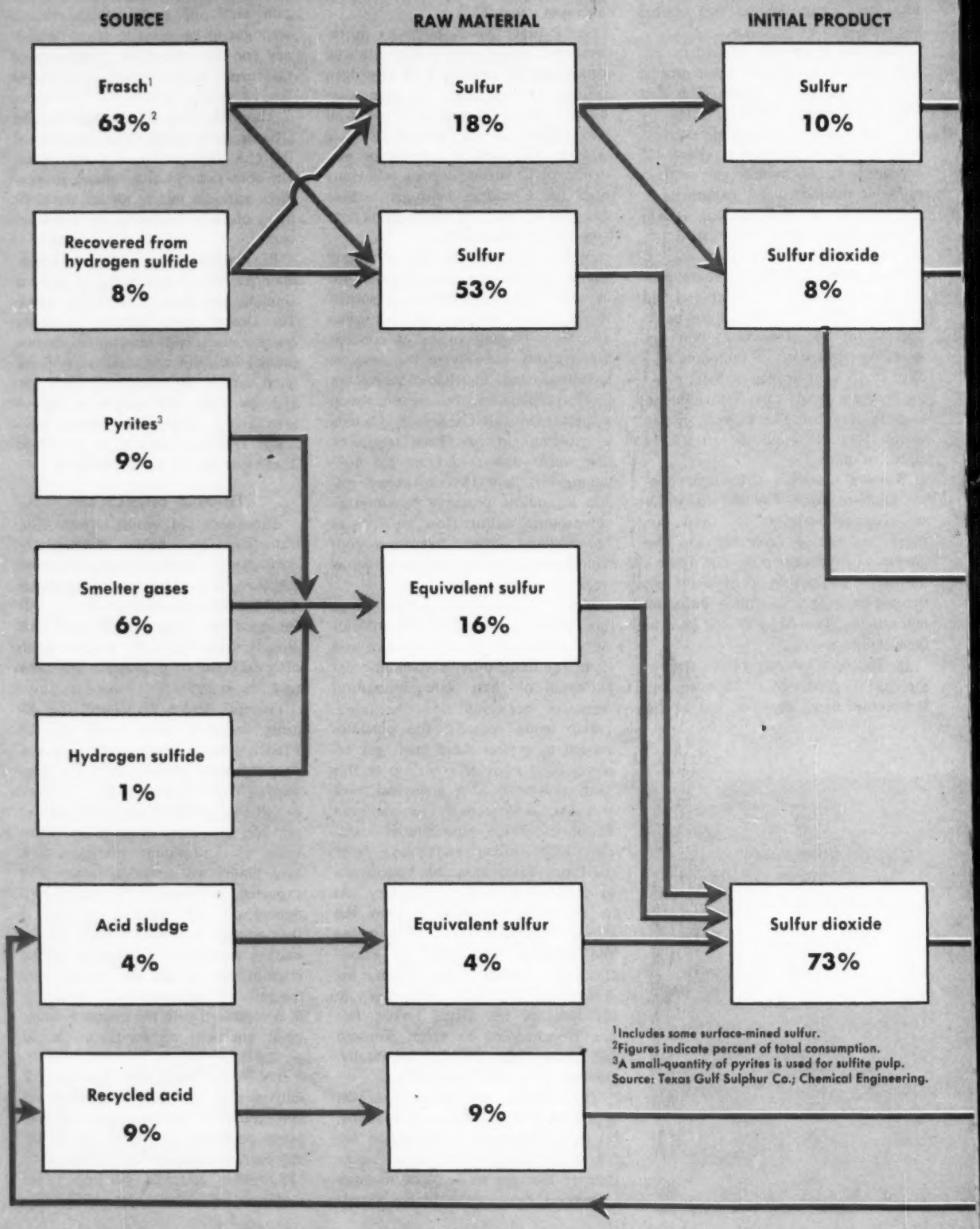
Thousands of miles from the Canadian gas fields, the partly government-owned French company, S.N.P.A., is banking on further penetration of European markets via sulfur recovery from gas. France has already moved up from a 0.1% share of world sulfur production in 1956 to 1.7% in 1958.

General Andre Blanchard, the ex-army engineer who heads up the French sour-gas recovery project, propounds the philosophy of his company: "We will have a lot of sulfur to sell, but we shall not sell a ton for one sou less than competition forces upon us. Sulfur demand from new acid plants will increase faster than expected, we believe. If sulfur producers do not become panicky, if they respect each other's places in the market and work to increase sulfur consumption, I see no reason why the price of sulfur—already too cheap in comparison with the prices of other great chemical commodities—should go lower."

S.N.P.A.'s initial unit, handling 37 million cu.ft. of gas and producing 200 tons/day of elemental sulfur, came onstream in April 1957. By this year, production had increased to 185 million cu.ft. of gas and 1,000 tons/day of sulfur. By 1962, the

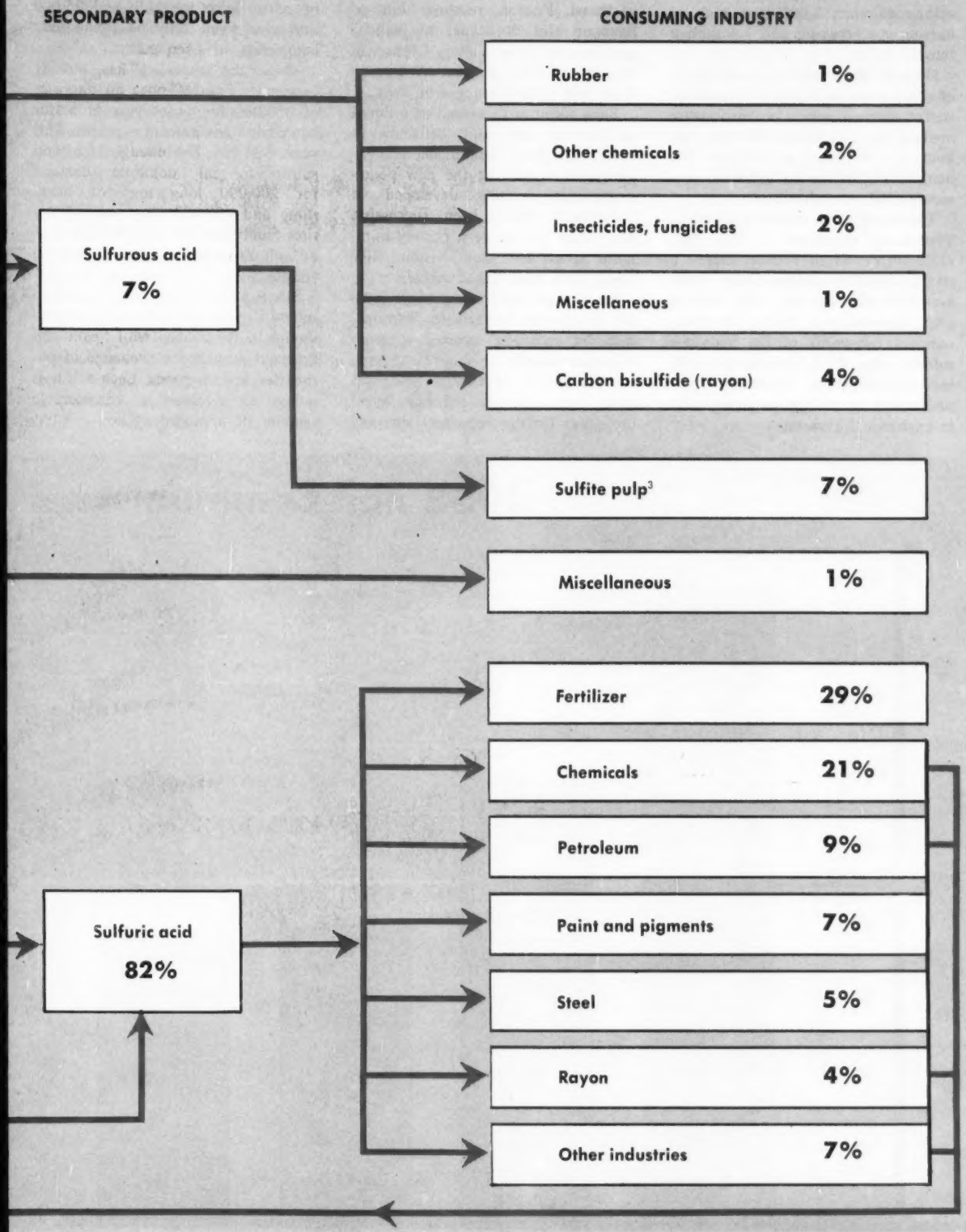
	Sulfur demand index	Federal reserve index
1920	36	41
1930	45	49
1940	57	67
1950	114	112
1951	119	120
1952	112	124
1953	117	134
1954	119	125
1955	134	139
1956	139	143
1957	134	143
1958	124	133

U. S. sulfur—from source



[1]Includes some surface-mined sulfur.
[2]Figures indicate percent of total consumption.
[3]A small-quantity of pyrites is used for sulfite pulp.
Source: Texas Gulf Sulphur Co.; Chemical Engineering.

to ultimate consumer



annual capacities at Lacq are scheduled to be 1.4 million bbls. of high-octane gasoline; 8,000 tons each of butane and propane; and 1.4 million tons of sulfur.

Between the first and second stages of this expansion, S.N.P.A.'s technical staff adopted the water-pressure method for scrubbing the gas, an innovation in natural gas practice. The method is familiar to synthetic ammonia processors, however.

The move is an economy measure. The plant investment is less, but, more important in France, there's a steam-utilization saving—about 70-80 tons/hour in treating 150 million cu.ft./day of gas. Water scrubbing removes two-thirds of the hydrogen sulfide; the final cleanup is with monoethanolamine. Plans are now under way to deliver ethylene oxide in exchange for amine.

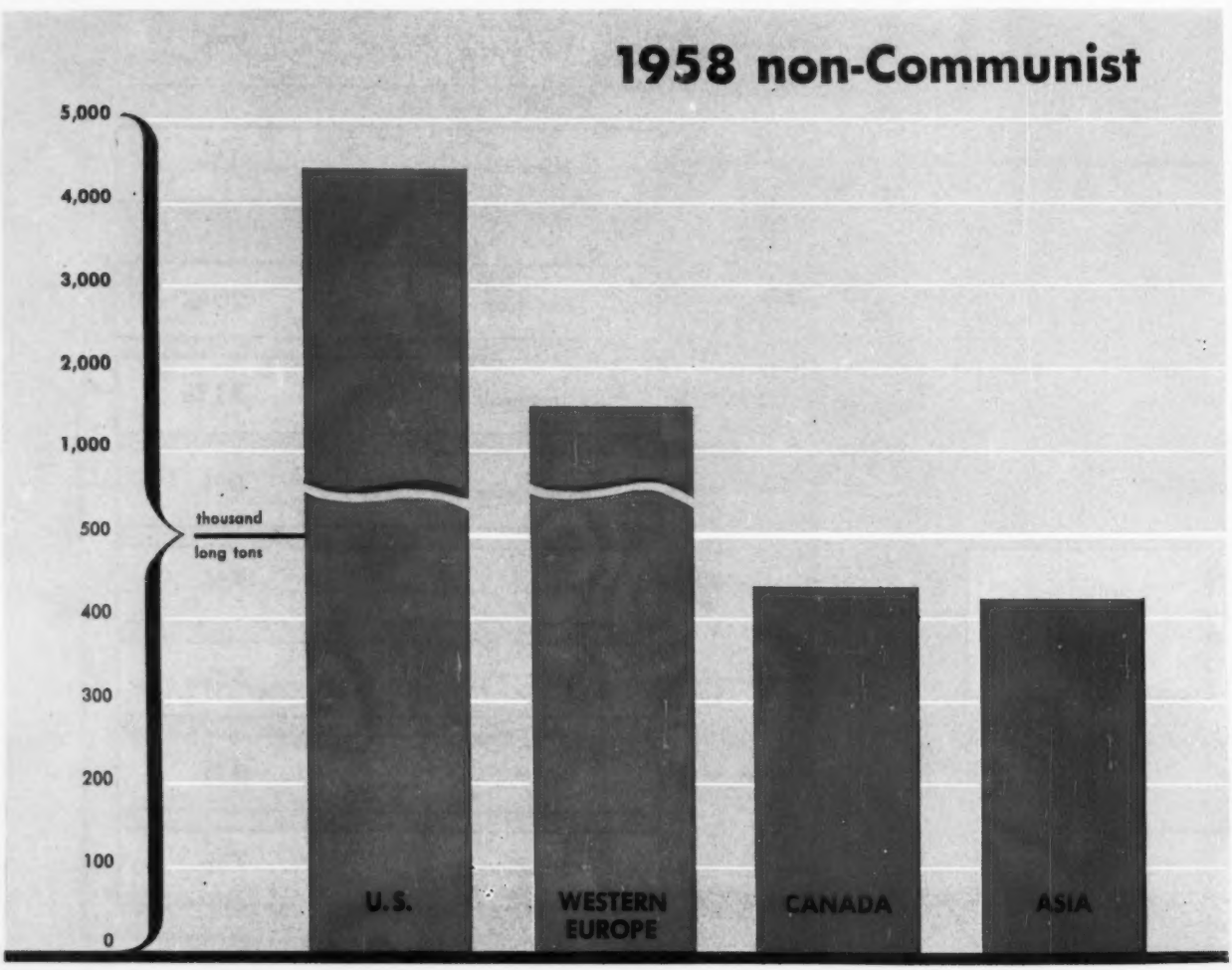
Demand for Lacq gas is large. A network of pipelines already covers southeast France, reaching out to Bayonne and Bordeaux, to Nantes, and into the Loire Valley. Lyons will be reached this summer. A line to Paris will carry Lacq gas in 1961.

Lacq sulfur is recovered as a liquid and vatted; only bulk deliveries in lump form have been made; but experiments in making the new pelletized form recently developed in Scandinavia have been successful. The pellets are dustless, occupy minimum space for their weight, flow more freely than flaked sulfur.

Most Lacq shipments have gone 50 miles west by rail to Bayonne, then by coastwise steamer to transhipment points; or they have gone east by rail to Marseilles, Sete, and other centers, where refineries grind the sulfur for the important vineyard trade. Raffineries de Soufre Reunies, once a buyer of 50,000 long tons/year of sulfur from the U.S. and 25,000 tons/year from Italy has gone over completely to Lacq sulfur.

Thus, the expected has already happened. France—once an importer of 350,000 long tons/year of sulfur and pyrites—is now an exporter. This year, S.N.P.A. has enough elemental sulfur to fill domestic demand for 200,000 long tons of brimstone and 400,000 long tons of pyrites (equivalent to 150,000 long tons of sulfur), besides some exportable surplus.

S.N.P.A. obviously will continue to supply French sulfur demand and, although trade treaties with Spain and Portugal provide for exchange of pyrites for French goods, Lacq sulfur is going to displace a considerable amount of imported pyrites.



So far, only a few shipments have been made to British channel ports, the Netherlands and West Germany. Claude Bienvenu, in charge of sulfur sales, calls them experimental deliveries. Meanwhile, modern loading facilities are being installed at Bayonne and a stockpile is being built up. Anywhere from Scandinavia to North Africa, Lacq sulfur's freight advantage over Gulf Coast sulfur will be at least $3/long ton.

MID-EAST AND RUSSIA

Another source of recovered sulfur looms in the Middle East, where there are extensive sour gas fields and where oil is often contaminated with sulfur. Middle East sulfur production —from petroleum and sludge acid recovery operations—now is used chiefly in producing sulfuric acid for captive refinery consumption.

In Iran, the big Abadan refinery produced 77,000 long tons of virgin acid and 30,000 long tons of regenerated acid in 1957. About 7,000 long tons of sulfur came from refinery operations and 11,000 long tons from gas-cleaning operations. In Iraq, the new 300-tons/day hydrogen sulfide recovery unit, now being built by Ralph M. Parsons, will clean 80 million cu.ft./-day of gas for delivery to a nearby plant; the latter will produce 250,000 tons/year of ammonium sulfate and 21,000 tons/year of 100% acid. In Saudi Arabia, both Bahrein and Arabian American, and, in Egypt, Anglo-Egyptian, all have acid plants ranging in output from 20-30 tons/day. A new refinery in Syria will include a sulfur-recovery unit of 80-tons/day capacity.

Middle East sulfur reserves are large, offer substantial opportunities for further development.

Although the facts are cloudy, Russia has evidently met the increasing sulfur requirements of her expanding industries. It's reported that production of sulfur in all forms approaches 2 million long tons. Of this, possibly 175-200,000 long tons is elemental sulfur—from the Orkla pyrite process and recovered from Baku oil.

MEXICAN SULFUR BOOM

Last year, Mexican sulfur production (all forms) reached a high of 1.254 million long tons. Most of the output, about 1.2 million long tons, was Frasch sulfur. And from all indications, there will be more this year.

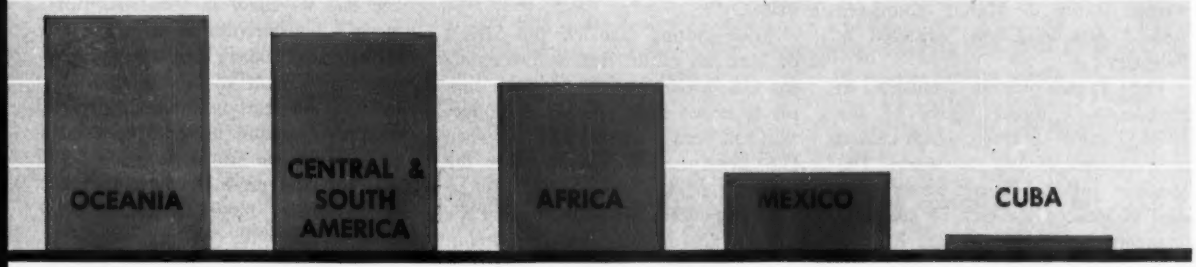
According to the Instituto Mexicano de Azufre, a nonofficial organization sponsored by the sulfur-producing companies in Mexico, sulfur production in March hit 116,681 long tons, compared with 107,090 long

sulfur consumption

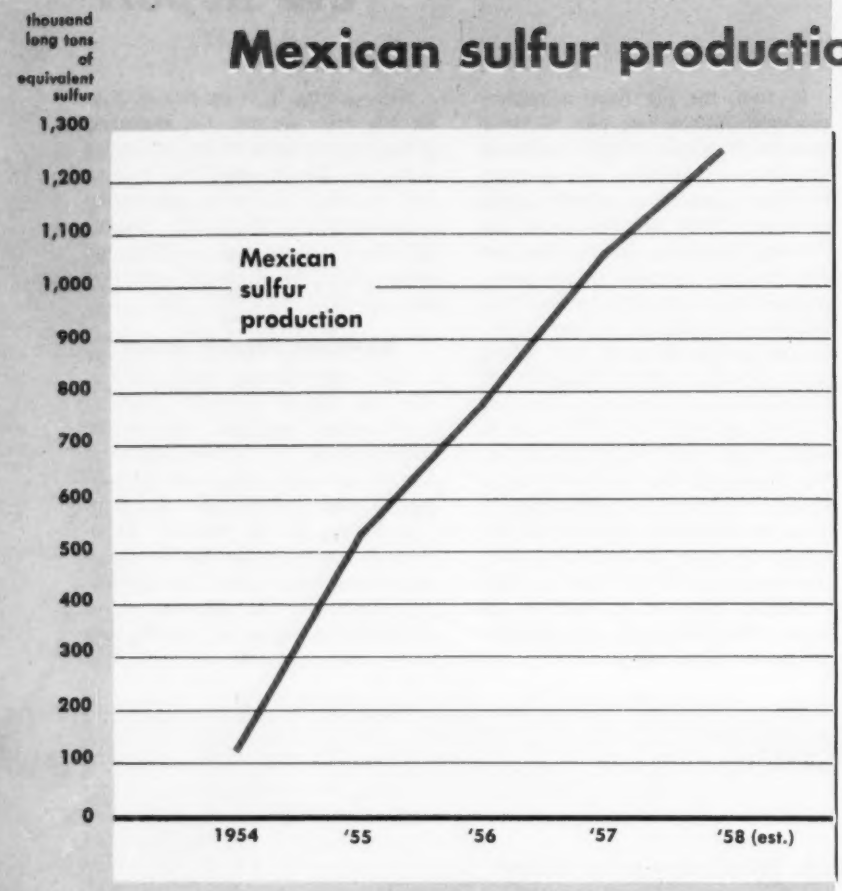
How the totals break down by source

	Frasch	Recovered	Native	Total
		(thousand long tons)		
U.S.	3,683	682	50	4,415
Western Europe	900	472	215	1,587
Canada	320	115	—	435
Asia	192	27	206	425
Oceania	280	—	—	280
Central & S. America	154	36	71	261
Africa	197	3	—	200
Mexico	25	50	20	95
Cuba	15	—	—	15
	5,766	1,385	562	7,713

Note: Statistics based on preliminary data. Source: Freeport Sulphur Co.



Mexican sulfur production climbs fast...



tons in February and 107,909 long tons in March of last year.

Cia. de Azufre Veracruz (Gulf Sulphur Corp.'s Mexican affiliate) had a first-quarter '59 production total of 74,048 long tons, compared with only 54,841 long tons for the same period last year. Foreign sales of Mexican sulfur during the first quarter of this year totaled 233,844 long tons, compared with 224,593 long tons shipped during the same period last year.

Azufrera Pan Americana (affiliated with Pan American Sulphur) shipped 78,772 long tons of all-yellow, filtered sulfur in March, compared with 57,603 long tons exported in February.

The Frasch-process industry in Mexico is a direct legacy of the 1950-51 sulfur shortage, which caused repercussions around the world. The Mexican sulfur industry would have died in infancy for lack of adequate financing were it not for the Export-Import Bank, which loaned funds to help build the first two plants—Mexican Gulf and Pan American Sulphur. PAS is prospering, while Mexican Gulf is out of business—one of the biggest setbacks ever suffered by the bank.

Nevertheless, the Mexican industry established itself in a surprisingly short time—not without difficulty, however. World sulfur buyers were glad to see a new source of sulfur, but few were eager to break with established suppliers. Under the circumstances, the Mexican companies could break into the world market only by cutting prices.

Price cutting signaled the arrival of Mexican sulfur. But, unfortunately for U.S. producers, the Mexican supply appeared right after U.S. production had been increased and just when U.S. demand was tapering off in the recession of 1957-58.

Disorganized prices didn't profit the sulfuric acid makers. Their sales contracts are usually tied to sulfur prices, and they were already complaining that acid prices were out of line with rising costs. The long-expected sulfuric acid price advance was obviously impossible after the sulfur price cuts.

In 1951, Petroleos Mexicanos (the government-owned monopoly) built a sour gas sulfur-recovery plant of 120-long-tons/day capacity at Poza Rica in Veracruz State. It has been enlarged to 200 long tons/day. For three years, Pemex delivered 70 long tons/day of sulfur and 5 million cu.ft. of gas free of charge to the government-owned fertilizer factory. Later, it paid $2.65/long ton for sulfur and 1.7¢/1,000 cu.ft. of gas. Less than half the recovered sulfur has been sold to independent domestic makers of sulfuric acid. All the Poza Rica sulfur is delivered in flake form.

Mexican recovered sulfur has had small effect on the sulfur market so far. Most of it is sold to the government superphosphate plant at a price that reflects political considerations more than commercial factors. But the Mexican government can't indefinitely override the economics of this by-product operation. Sulfur recovery must await the demand for sweetened sour gas.

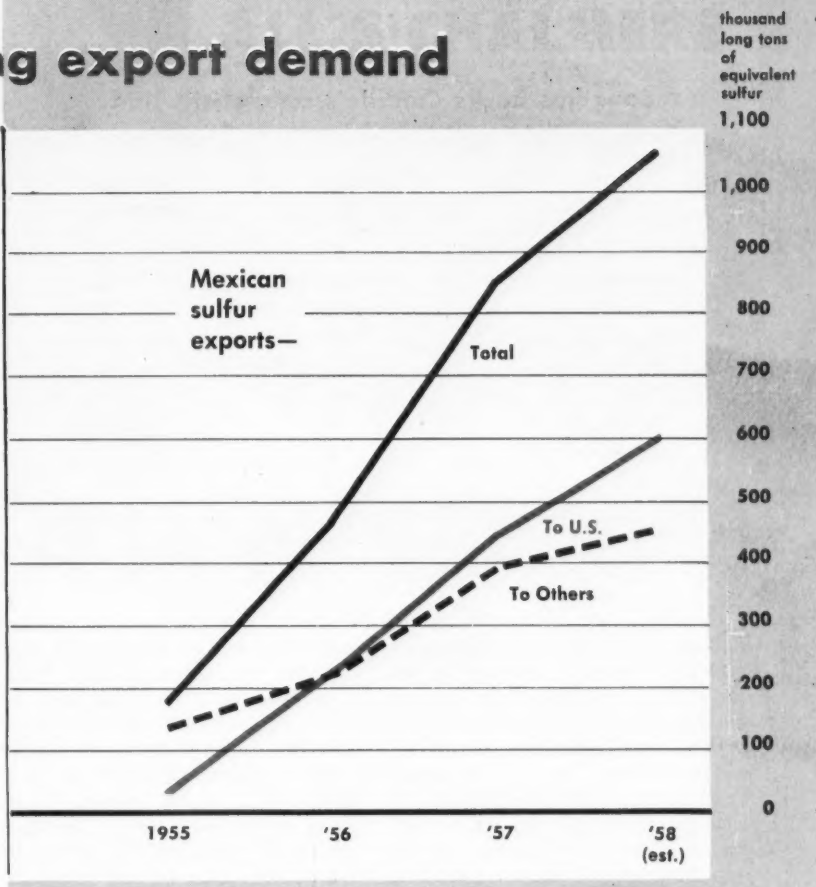
Mexican sour gas utilization won't increase quickly. The country's eight known big gas fields are all sweet, except those at Poza Rica and Tobasco. It's geologically sound to surmise that the oil and sour gas pools in the eastern foothills of the Rockies may extend south of the border, but this is still unproved.

U. K. REPERCUSSIONS

Besides stimulating the Frasch industry in the U.S., bringing in 1 million additional tons/year from Mexico and increasing both current output and new proved reserves in Louisiana and Texas, the 1950-51 sulfur shortage had its effect in the U.K. (formerly a big importer of sulfur). U.K. sulfuric acid makers turned to gypsum (calcium sulfate) and barites (barium sulfate). As starting materials, these widely abundant minerals side-step both pyrites and brimstone.

In England, producers have pursued the anhydrite (anhydrous calcium sulfate) process with determination; the

...to feed soaring export demand



U.K. has limited supplies of sulfur and pyrites. In 1950, when imports of Frasch brimstone were drastically curtailed, U.K. chemical leaders were caught short. Imperial Chemical Industries expanded its Billingham plant and by 1955 had offered its know-how to a group of big acid consumers. They joined in building a £ 5 million sterling plant at Widnes.

Two years later, Marchon Products Ltd., large detergent maker, set up its Solway Chemicals Ltd. subsidiary to make sulfuric acid (now the third-biggest anhydrite acid plant in the U.K.). Marchon Products' Cumberland plant stands on one of the richest anhydrite seams in Great Britain.

From the British viewpoint, results have been satisfactory. Tough kinks in the process have evidently been ironed out. The chemistry of the process is straightforward, relies on the reduction (by heating with carbonaceous material in the absence of air) of anhydrous calcium sulfate to calcium oxide and sulfur dioxide. But the process has always presented engineering difficulties complicated by variations in anhydrite, coke and clay.

How far the British chemical industry has gone in its efforts to achieve self-sufficiency in sulfur is evident. In 1954, U.K. sulfur demand by source was spread as follows: elemental sulfur, 36.2%; pyrites sulfur, 31.8%; spent oxide sulfur, 18.9%; zinc concentrates sulfur, 8.0%; anhydrite sulfur, 5.1%. By 1958, in contrast, the pattern had shifted as follows: elemental sulfur, 40.2%; pyrites sulfur, 19.5%; spent oxide sulfur, 14.7%; zinc concentrates sulfur, 5.8%; anhydrite sulfur, 19.8%.

OTHER RECOVERY PROCESSES

Regeneration or fortification of spent acid and recovery of sulfur from the stack fumes of metal smelters and industrial plants are other types of recovery operations in North America and Europe. They have their own economic, geographic, and chemical reasons-for-being.

In general, recovery processes exert a negative effect on the world sulfur market: they account for a certain amount of acid-making capacity, which replaces a conspicuous, but not insignificant, sulfur tonnage. Non-Communist nations' recovery from these sources is hardly a major contribution to sulfur tonnages, compared, say, with sulfur recovered from sour gas. In the U.S., the percentage of total acid made from waste and by-product sources is estimated at 17%; brimstone, 71%; pyrites, 12%.

With elemental sulfur becoming more available in tonnage quantities in many widely separated geographic areas, recovery projects will probably become less attractive. In fact, much of the impetus to recover sulfur oxides from the stacks of large coal-burning plants has come from air-pollution-control considerations rather than from management's desire to recover a salable by-product.

The petroleum industry is applying new refining techniques, which yield cracked gases from which hydrogen sulfide can be removed. Refinery production of sulfuric acid (at one time reduced by solvent-extraction processes) has once again increased as a result of the alkylation process and the introduction of many petrochemical operations.

OFFSHORE OUTLOOK

Offshore Frasch sulfur may add another twist to the sulfur pattern. It's probably the most spectacular development in the industry since 1895, when Herman Frasch first pumped molten brimstone to the surface.

Offshore sulfur was discovered by Humble Oil & Refining Co., drilling for oil along the Gulf Coast in the late 1940s. Since then, over 125 underwater domes have been located. If the dry-land average holds, 15 of these will be commercial sulfur deposits.

Back in 1954, Humble found a dome of several hundred acres in Grand Island Block 18, seven miles off the Louisiana coast and 2,000 ft. below the floor of the Gulf. After

Sour gas backs Canada's competitive bid

Field	% Hydrogen sulfide	Sulfur value/ gas value
Beaver Creek	35.0	4:2
Waterton	31.6	3:4
Innisfail	19.3	1:6
Savannah Creek	14.1	1:0
Pincher Creek	10.4	0:7
Nevis	6.5	0:4
Jumping Pound	3.8	0:2
Westerose South	1.8	0:1

Note: Calculated on the basis of 15¢/1,000 cu. ft. for pipeline gas and $23.50/long ton for sulfur, the current quoted market price f.o.b. mine in U.S.
Source: Freeport Sulphur Co.

drilling 14 test wells, the company's geologists estimated reserves at between 30 and 40 million tons—one of the largest sulfur domes on record.

Humble decided not to develop this sulfur property, instead approached Freeport, which had inaugurated seawater mining at Bay Ste. Elaine and was the first sulfur company to dip into the shallow Gulf waters at Lake Pelto. Because the project involved novel problems, the two companies signed an agreement in 1956 that provided two years for experimental work and two years for building the plant. The plant must come onstream in 1960. The firms will divide profits.

This Grande Isle mining venture presents formidable problems: 100-mile-an-hour winds, waves 40 ft. high; extremely corrosive operating conditions. Subsidence could wreck the mining platform and dump the plant into the sea. There also are problems to be licked in getting the sulfur ashore.

Freeport has just awarded a $2-million contract to Sharman, Allen, Gay and Taylor Pipeline Contractors Inc. (Houston) to fabricate and install the seven-mile-long undersea pipeline to carry sulfur ashore. It will be three pipes in one: a 14-in. protective casing, a 7⅝-in. hot-water jacket and a 6-in. sulfur line. Molten sulfur will flow into liquid sulfur barges, which will be towed 25 miles to Freeport's Port Sulphur shipping point. The operation will be brand new in the sulfur industry.

Freeport's giant Y-shaped structure will be the biggest permanent structure in the Gulf, dwarfing the offshore oil drilling platforms.

Offshore sulfur opens to the Frasch industry a new, yet unplumbed, future extending far beyond the limits of mainland reserves. It will have novel aspects. Leases must be secured from the states or the federal government by competitive bidding, which considerably raises the preliminary expenses of exploring for sulfur. Offshore mining calls for a large capital investment in plant and facilities. But, Freeport engineers expect that Grand Isle will be one of the world's largest and most efficient Frasch operations.

Their confidence reflects the optimism that's shared by the entire industry, which feels that growing demand will favor all producers of sulfur—from whatever source.

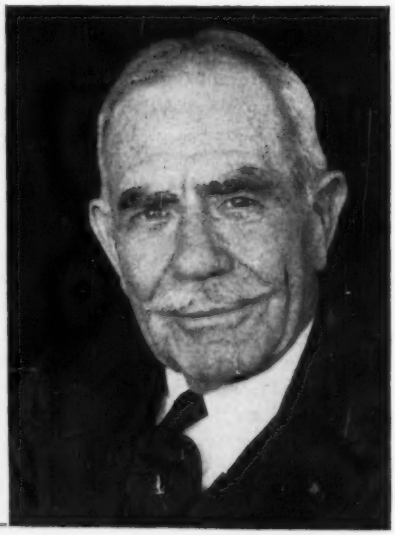
PERSPECTIVE

The big hope of U.S. sulfur producers is for increasing world sulfur demand, especially in underdeveloped countries. Producers hope this will eventually boost industry sales, which declined some 8% last year from 5 million long tons in 1957. Some of this increased demand is expected to come from cutbacks in pyrites usage.

Even though newer sources of sulfur mean increasing competition, U.S. sulfur producers will move to meet it. Texas Gulf Sulphur, for example, is setting up regional U.S. terminals to supply customers in strategic industrial areas. And this month, Sulphur Export Corp. moves into its second year as overseas marketer for all U.S. Frasch producers.

Meet the author

WILLIAMS HAYNES needs no introduction; his credits take up an entire column in "Chemical Who's Who." This sulfur report by Haynes is a preview of his new book, "Brimstone: the Stone that Burns," to be published next month by Van Nostrand. He is currently writing the life story of E. I. du Pont, for Alfred Knopf.



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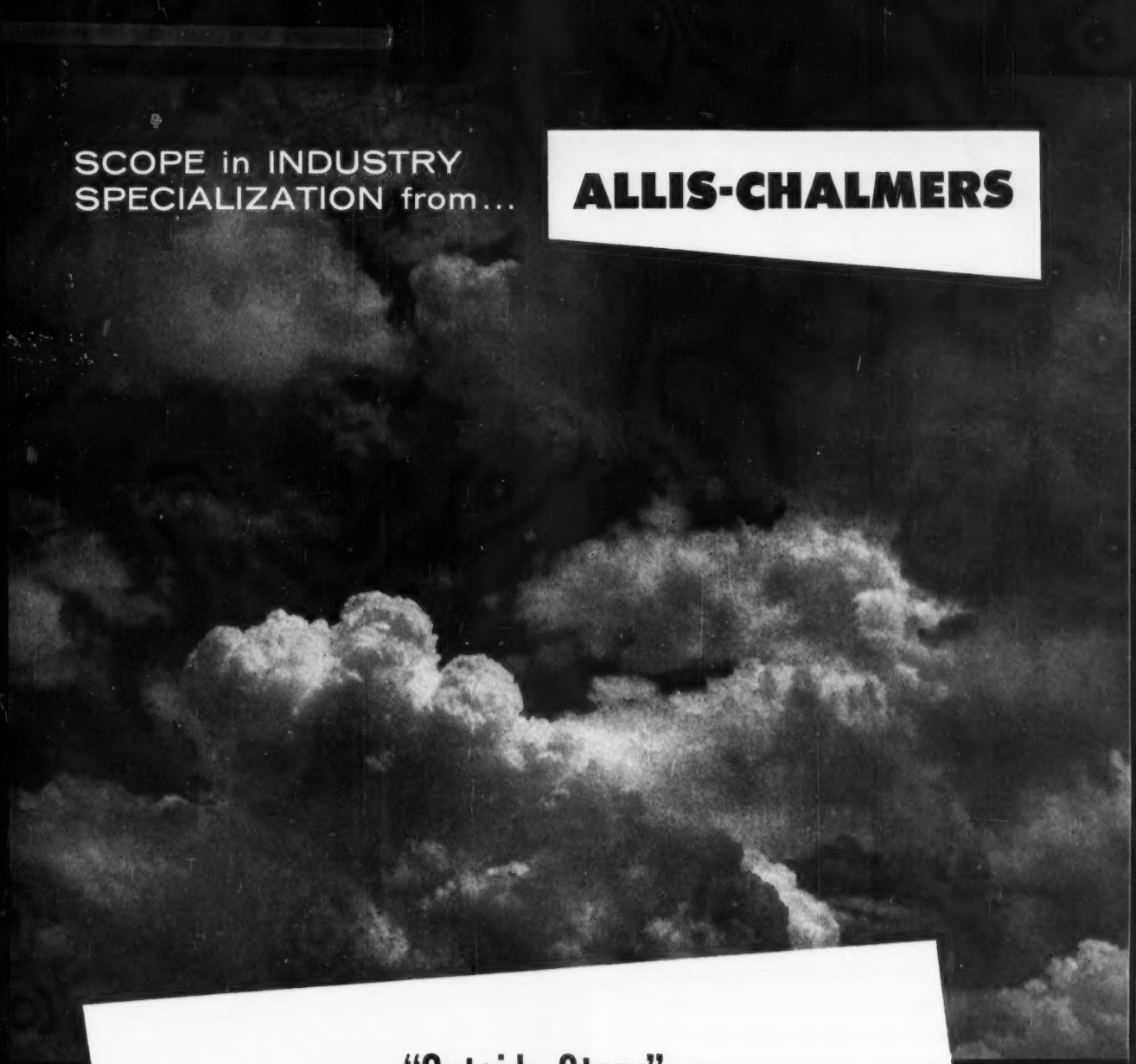

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Market Newsletter

CHEMICAL WEEK
May 16, 1959

Dow Chemical's quiet 1¢/lb. price cut on phenol last week didn't go unnoticed for long. Within hours after the first Dow customers had been told, other phenol marketers were "studying" Dow's move, soon informed *CW* that they would follow suit.

The cut, explained Dow, was made to "broaden the base of phenol usage"—a reason since echoed by other producers. One reason for no fanfare about the price cuts: so that phenolic resin makers, already working on narrow profit margins, wouldn't be forced by resin buyers to trim their tags immediately.

The reduction brings tank-car price of phenol to 16½¢/lb. delivered; carload and truckload quantities are 18½¢/lb. in drums; l.c.l. amounts, 20½¢/lb.

The 1¢/lb. cut came only six months after a ¾¢/lb. cut. The industry is plagued by a huge overcapacity that will become still larger in the next year unless phenol demand can be increased significantly.

Total U.S. synthetic and natural phenol capacity will reach a high of 872 million lbs./year at the end of '60—which is about 53% more than anticipated demand (*CW, Feb. 21, p. 89*). Capacity at the end of '58 was 762 million lbs.—49% more than the estimated 510-million-lbs. output.

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Prices of three types of urethane elastomers were also reduced last week. New prices posted by Du Pont—retroactive to May 1—for "Adiprene" L urethane rubber and two related development products (LD-167 and LD-213) range from 33¢ to 45¢/lb. lower than previous listings. The new prices (per pound, f.o.b. Carney's Point, N.J.): carloads (55-gal. drums), $1.15; 55-gal. drum, $1.17; 5-gal. pail, $1.30; quarts, $1.65.

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U.S. production of uranium concentrate increased significantly in '58, compared with '57 output. A just-released report by the U.S. Atomic Energy Commission shows that 23 mills last year turned out over 24.8 million lbs. of uranium oxide, worth over $233 million. This compares with output of almost 17 million lbs. of oxide worth close to $167 million from 16 mills in '57.

Utah was again top producer, but New Mexico jumped suddenly to a close second by turning out more than 7.2 million lbs. (Utah produced close to 7.8 million lbs., third-place Colorado about 5.8 million.)

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There's a glimmer of hope for stability in lead and zinc markets. It's a result of preliminary agreements reached at a special United Nations Lead and Zinc Committee hearing last week. Production cutbacks ranging

from 2 to 10% were volunteered by some producing nations in an effort to bring '59 lead and zinc output down 45,500 and 52,000 tons, respectively.

But because not all producing nations are ready to go along with the volunteered cutbacks, there's no assurance that the program will get off the ground. On the strength of the limited and tentative agreement, however, lead prices were promptly upped ½¢/lb. to 12¢/lb. by leading smelters and producers.

•

Benzene prices may soon be under pressure "from imbalance of demand in relation to mid-'59 production capacity." That was the warning given this week by R. A. Erickson of Universal Oil Products Co. at a meeting of the American Coke and Coal Chemicals Institute at Westchester Country Club in Rye, N. Y.

Erickson points to benzene imports as the "major unknown variable" that will affect benzene prices. But, he added, the projected growth trend of chemical benzene requirements (*CW, March 7, p. 57*) should assert itself, over the long term, to strengthen prices.

The speaker also underscored an important difference in pricing of benzene, toluene and xylene. Motor gasoline octane blending considerations are not a factor in current benzene pricing: but pricing of toluene is related to total demand, including use as a gasoline octane improvement agent as well as solvent and chemical uses.

The U.S. provides a "good hunting ground" for foreign producers of basic materials, Fletcher Byrom, vice-president of Koppers' Tar Products Division, emphasized at the ACI meeting. "The only practical solution," he said, "is through . . . import restriction," especially against Russian chemicals such as benzene.

Byrom backed his plea with these examples of rough competition: in '58, purchases of domestic benzene represented less than 60% of U.S. capacity—15% of demand is supplied by foreign producers; about the same share (15%) of naphthalene and of cresols and cresylic markets goes to foreign sellers; pyridine imports accounted for 28% of total U.S. demand in '57, a much bigger 40% in '58; about 21% of U.S.-consumed creosote is imported.

Coal-tar distillers have also felt the impact of foreign competition, said Byrom, as a result of lowered domestic aluminum production due to foreign imports. Coal-tar pitch is used to make aluminum.

SELECTED PRICE CHANGES—WEEK ENDING MAY 11, 1959

	Change	New Price
DOWN		
Phenol, USP, syn., tanks, lb.	$0.01	$0.165
Tin metal (Straits), lb.	0.00375	1.02625

CHEMICALS and PLASTICS

FMC Chemicals & Plastics Division offers a series of mono- and di-epoxides – materials which are finding diverse applications in epoxy resin formulations, as crosslinking agents for vinyl and acrylic polymers, for the synthesis of surface-active materials, de-emulsifiers, polyurethanes, lubricant additives, perfumery and flavoring materials, stabilizers, corrosion inhibitors, and as reactive intermediates.

Also available are a group of phosgene derived chemicals including urethane and ethyl chloroformate–materials of interest in the synthesis of pharmaceuticals, polycarbonates, specialty isocyanates and polyurethanes.

FMC Chemicals & Plastics Division produces allylic monomers including DAPON® resin (diallyl phthalate) and DAPON® M resin (diallyl isophthalate) – materials with high electrical properties and unexcelled for molding and laminating applications especially where resistance to severe temperature and humidity conditions is needed.

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EPOXY CHEMICALS

Alpha-Pinene Oxide	Dicyclopentadiene Dioxide*	Limonene Monoxide (Dipentene Monoxide)
Butyl Epoxy Stearate	Dodecene Oxide	Methoxy Ethyl Epoxy Stearate
C_{16}-C_{18} Olefin Oxide	Limonene Dioxide*	Octylene Oxide

SPECIALTY CHEMICALS

Allyl Acetone	Methallyl Acetate
Aluminum Chloride, Anhydrous	Methallyl Alcohol*
Dimethyl Carbonate*	Methallyl Chloride
Diphenyl Carbonate*	Methyl Chloroformate
Ethyl Alpha-Allyl Acetoacetate	Phosphorus Oxychloride
Ethyl Carbamate (Urethane)	Phosphorus Trichloride
Ethyl Chloroformate	Tributyl Phosphate

RESINS

A-20 Epoxy Resin*	DAPON® (Diallyl Phthalate) Resin
DAPON® M (Diallyl Isophthalate) Resin	

ALLYL MONOMERS

Diallyl Adipate	Diallyl Isophthalate	Diallyl Maleate
Diallyl Diglycollate		Diallyl Phthalate

*In Development Quantities.

PLASTICIZERS (OHIO-APEX)

Product	*Chemical Name*
ADIPOL® 810	Isodecyl Octyl Adipate
ADIPOL® 10A	Di-Iso-Octyl Adipate
ADIPOL® BCA	Di-Butoxyethyl Adipate
ADIPOL® DIBA	Di-Iso-Butyl Adipate
ADIPOL® 2EH	Di-2-Ethylhexyl Adipate
ADIPOL® ODY	n-Octyl n-Decyl Adipate
ADIPOL® XX	Di-Isodecyl Adipate
Butyl Oleate	—
Butyl Stearate	—
Dibutyl Phthalate	—
Di "CARBITOL" Phthalate	Bis (Diethylene Glycol Monoethyl Ether) Phthalate
Di-Isodecyl Phthalate	—
Dinopol IDO	Isodecyl Octyl Phthalate
Dinopol MOP	Mixed Octyl Phthalates
Dioctyl Phthalate	—
D.I.O.P.	Di-Iso-Octyl Phthalate

Product	*Chemical Name*
KAPSOL®	Methoxyethyl Oleate
KP-18	Primary Plasticizer
KP-20	Primary Plasticizer
KP-23	Butoxyethyl Stearate
KP-90	Epoxy Plasticizer
KP-140	Tri-Butoxyethyl Phosphate
KP-201	Dicyclohexyl Phthalate
KP-260	Primary Plasticizer
KRONISOL®	Di-Butoxyethyl Phthalate
KRONITEX® AA	Tricresyl Phosphate
KRONITEX® 1	Tricresyl Phosphate
KRONITEX® K-3	Tricresyl Phosphate
KRONITEX® MX	Cresyl Phenyl Phosphate
METHOX®	Di-Methoxyethyl Phthalate
OHOPEX® Q10	Octyl Fatty Phthalic Acid Esters
OHOPEX® R-9	Mixed Octyl Fatty Acid Esters
Tributyl Phosphate	—

EXPERIMENTAL PRODUCTS

FMC Chemicals & Plastics Division has considerable background and experience in the following fields: 1. Epoxy chemicals and epoxidation; 2. Phosgene derived chemicals (carbamates, chloroformates, carbonates); 3. Acetoacetic ester chemistry; 4. Allyl and methallyl compounds. We can in many cases supply small research samples of products in these general fields.

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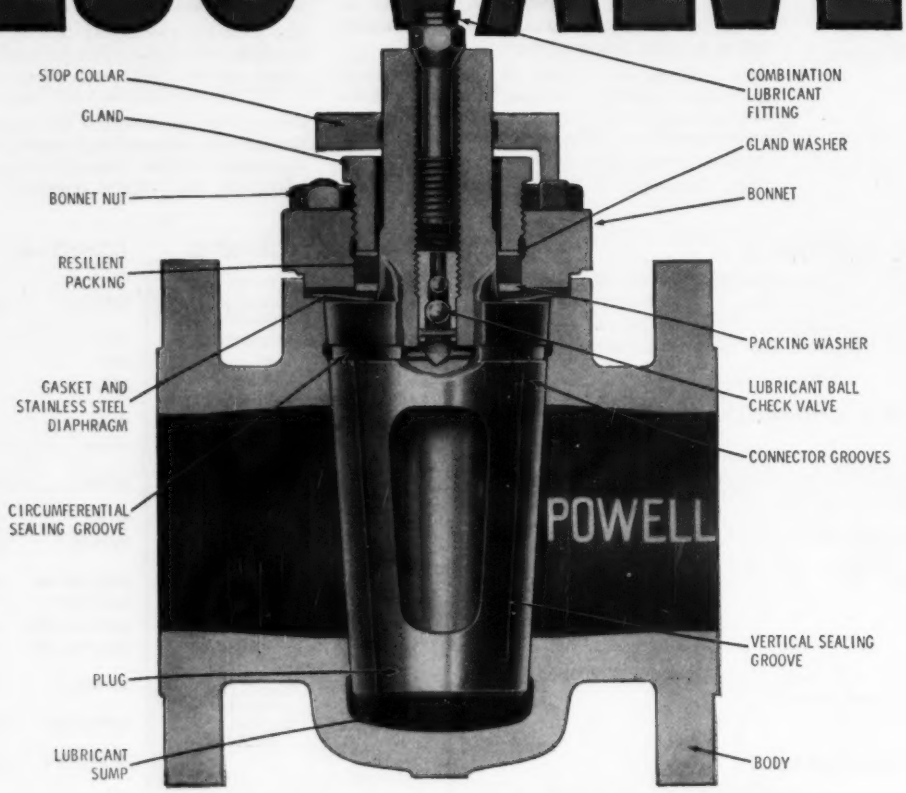

Sectional view Powell Screwed Gland Lubricated Plug Valve.

Like all Powell Valves, Powell Lubricated Plug Valves are superior in their field . . . and have many advantages over other conventional types of Valves.

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- Quick, complete shut-off—a quarter turn will close or open the valve.
- Tapered Plug assures positive seating.
- Machined surfaces of plug and body are not exposed in the open position. Any media adhering to the plug when in the closed position is removed when plug is rotated.
- Cavity-free straight passage assures streamlined flow in either direction. Scale and sediment cannot collect.

Powell Lubricated Plug Valves are available in sizes ½" through 16", depending on the type required—Semi-steel 175 and 200 pounds WOG;—Carbon Steel ASA 150 and 300 pounds.

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For all your valve needs, make it a policy to consult your local Powell Distributor—or write directly to us.

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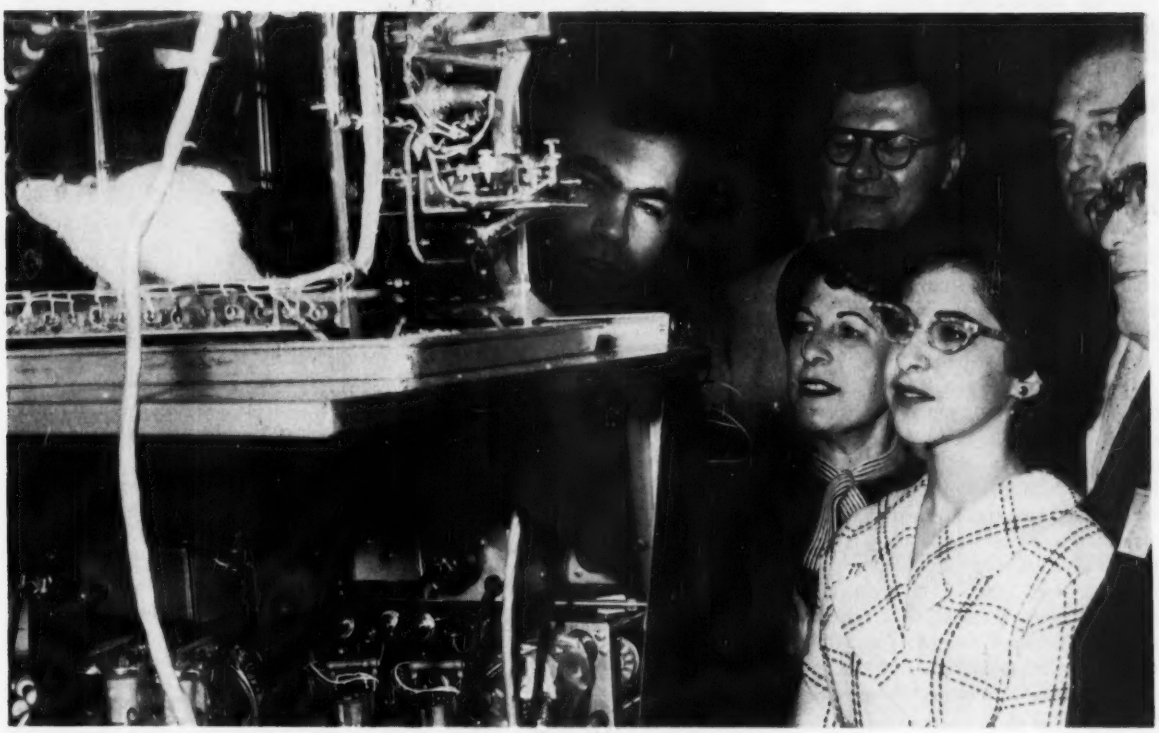

Pfizer laboratory exhibit typifies emphasis placed on research during recent CPI annual meetings.

Shareholders Hear the Research Story

Chemical process firms last week were cresting the annual wave of stockholder meetings, and a number of significant trends appear to be in the making. Major item: stockholders and management were giving more play to research, asking and answering specific questions on programs and projects.

One company that made much of its research activities was Chas. Pfizer & Co. (Brooklyn, N. Y.), whose displays depicted the firm's diversified research program (*above*). Other CPI concerns featuring research and development at their annual meetings included Stauffer Chemical Co. and Union Carbide Corp.

Decisions by some CPI executives to play up their research activities this year appear to have been made in anticipation of increased interest by stockholders. But one executive said some companies stress research because last year's recession left them little else to talk about.

Other Trends Indicated: Among the additional trends observed:

- Steadily increasing attendance. *CW*'s survey shows that 85-90% of the stockholders of the larger corporations were either present or represented by proxies at the annual meetings. This is indicative, observers feel, of stockholders' rising interest in corporate affairs.
- More businesslike atmosphere. Stockholders, for the most part, are attending annual meetings with business on their minds. Gone is the country-club air of former years.
- Postmeeting reports for shareholders. American Cyanamid and Monsanto Chemical Co. tell *CW* that they will send reports of their annual meetings to shareholders and, in some cases, company employees. Other firms are considering this way of keeping all shareholders abreast of developments, particularly the questions and answers exchanged at the meeting.
- Simplified meetings. CPI companies, with a few exceptions, are leaning toward shorter, less expensive, less elaborate meetings. "By eliminating luncheons," one spokesman said, "we can cut our annual meeting costs in half." Notable exceptions to this trend are Olin Mathieson Chemical Corp. and Reichhold Chemicals Inc. Required until this year by Virginia law to hold its annual meeting in that state, Olin Mathieson now plans to move the meetings about, encourage attendance, make meetings more elaborate. This year's meeting was a "tooth-cutting" exercise, a tryout, OM said. It was held in East Alton, Ill., site of Olin Industries' founding. Only a bit more ambitious than previous meetings at Saltville, Va., it was attended by 125 stockholders, lasted 45 minutes.

  Reichhold told *CW* that it hopes to hold future meetings in New York, have a more elaborate owners' get-together. In the past, meetings have been held at corporate headquarters in White Plains, N. Y., attended by about 50 shareowners.
- Faith in existing management.

Even at CPI meetings where "professional" shareowners poked deeply into management's philosophy and intent, there usually were resolutions complimenting management and directors for the past year's activities. There were no indications of deep-seated discontent, no apparent movements by shareholders to oust management.

New Techniques Used: Several firms outside the CPI employed new techniques that bear study by process-firm management. Equipment-maker Worthington Corp., for example, leased closed-circuit phone lines to 16 of its plants. For a half hour, at a total cost of $1,900, supervisory personnel meetings in those plants were able to "attend" the shareholder meeting being held in Newark, N.J. The supervisors heard talks by the board chairman and the president. In addition, the talks were recorded to be replayed at meetings in the firm's 24 domestic sales offices and 12 foreign plants. The effect, according to Worthington, was to have 2,000 supervisory personnel meeting along with the shareholders.

American Machine & Foundry Co. used another "first" in shareholder meetings by broadcasting portions of its meeting over the NBC radio network. Portions of the proceedings—recorded — were repeated the evening of the meeting on a 25-minute program titled "This Is AMF Stockholders Meeting of the Air."

Explaining the unusual idea, AMF Board Chairman Morehead Patterson said, "Today more than 8 million Americans own stock in American business, but only a relatively small number have ever been able to attend a stockholder meeting or to know how one is conducted. The broadcast also enabled us to communicate with AMF's 22,000 stockholders, 12,000 employees and the citizens in our 49 plant communities."

These novel ideas all prove that, like many other phases of corporate existence, the annual meeting is undergoing some significant changes. The objectives are to save money and time, yet reach more people. No matter what has forced these changes—increasing shareholder interest in sound business practices or better management—they seem to be endorsed. And that's a sure indication more changes in this direction are coming.

Esso's Murrell (right) plays host to pollution-control officials.

Debating Air Pollution Role

There's new heat to the debate between the U.S. Surgeon General's office and the petroleum industry over the latter's contribution to air-pollution control. Last week found both sides taking actions significant to chemical process firms whose antipollution efforts are under close scrutiny by the public as well as by big government officials.

Latest developments in the government-oil industry controversy: Surgeon General Leroy Burney has ordered a review of the oil industry's role in the Public Health Service's war on air pollution. And, oil industry leaders have stepped up their campaign to tell the public—and government officials—of the industry's role in combating air pollution (*above*).

Burney's review order resulted from strong denials by oil industry management of Burney's recent charges before the House Appropriations Committee. He told that group the oil industry was not cooperating with PHS in its attack on air pollution.

Industry Rebuttal: Most of the credit for Burney's action goes to American Petroleum Institute President Frank Porter. A letter to Burney from Porter denied the charges, pointed out that the industry has spent approximately $66 million on air-pollution control since '56, now spends an additional $1 million/year on air-pollution research.

Industry Action: But the industry did more than make its denial to Burney; it's looking at new ways to tell its story. In a recent talk, George Lloyd, assistant public relations manager, Esso Standard Oil Co., and information subcommittee chairman, smoke and fumes committee, API's refining division, challenged the industry to look to the many ways that it can improve public understanding of its efforts to eliminate the sources of air and water pollution. One way, he said, is by providing refinery tours for municipal and state pollution officials and the press. This method, he explained, was used recently by Esso's Bayway, N.J., refinery Manager Ross Murrell to demonstrate for officials air-pollution problems and progress (*above*).

Lloyd summed up the oil industry's problem, and incidently one shared by the CPI, by pointing out that it was particularly vulnerable to the "frowns of the community" that has an air-pollution problem.

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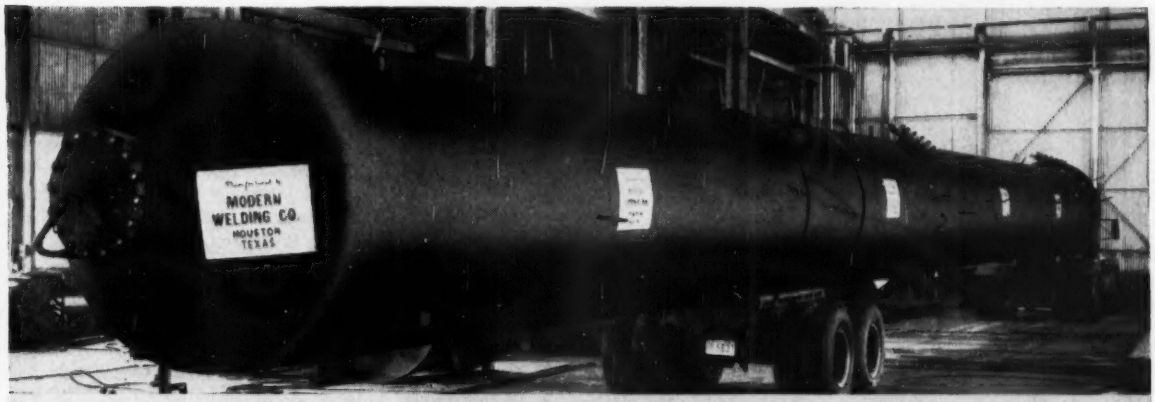
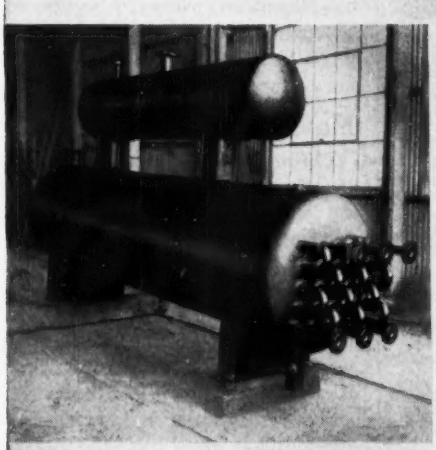
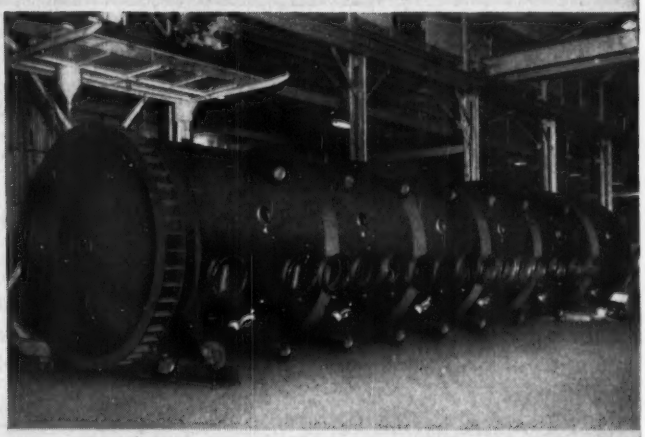


Fractionating Column—72" Dia. X 110'-0" length, ¾" wall thickness with 40 trays. All welds 100% X-ray quality. Constructed for internal pressure and full vacuum. Stamped A.S.M.E. Code. Total weight 83,000 lbs.



Heat Exchanger — Lower Section 4'-0" dia. X 14'-0". Upper Section 1'-8" dia. X 10'-0", ⅝" Carbon Steel Plate Wall. A.S.M.E. Code construction using tube bundle of schedule 160 pipe.



Styrene Stripping Column—9'-6" Dia. X 80'-0" length, ½" plate walls and ⅝" heads. Constructed and stamped A.S.M.E. Code. Vessel contains 14 stainless steel perforated trays, 16 manways, 146 couplings, and nozzles. Total weight 72,000 lbs.

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Wyandotte CHEMICALS
MICHIGAN ALKALI DIVISION

PACING PROGRESS WITH CREATIVE CHEMISTRY

Plastic Shelters Fair

In the functional, glass-fiber offices of Owens-Corning Fiberglas Corp. last week, company President Harold Boeschenstein proudly pointed out features of the glass-fiber-reinforced canopy for a U.S. pavilion to be erected at the American National Exhibition in Moscow in July.

Glass-fiber, umbrellalike structures will form a translucent cover for architectural, photographic and fashion exhibits. Ninety of them will be bolted edge-to-edge to form a 15,000-sq.ft. shelter. There will be four such clusters.

Corning and 40 other U.S. corporations have put up $151,000 to help finance this country's exhibits at the fair, supplementing State Dept. appropriations for the exhibition. The companies, most of them members of the Society of the Plastics Industry, assembled funds, design and manufacturing facilities to fill the government's request for a forward-looking example of American ingenuity.

Though the radical new design has never been tested in use, MIT engineers tried it out for strength. Among tests was a wind-velocity measure accomplished by putting a section of canopy up against the combined wind force from four B-26 bombers.

New Radiation Code

Chemical processors dealing in radioactive materials noted two events last week that may establish new standards for handling radiation.

First item — the announcement that next month delegates to the International Labour Organization's International Labor Conference will attempt to draw up an all-nation code of safeguards for industrial workers in contact with radioactive materials. The ILO meetings start June 3 in Geneva, Switzerland.

Of equal importance was word from the National Committee on Radiation Protection and Measurements that it is readying the first permissible-radiation-exposure standards for the general public. The recommendations may lead to major revisions in the nation's radiation safety standards. These permissible dosages may prove much lower than levels (unofficial) now used as guides.

On the international level, ILO has

shown concern with the expanding use of radioactive isotopes in industry and medicine. In announcing its forthcoming meeting, ILO said, "While it is practically impossible to estimate how many workers lie open to the risk of direct or indirect exposure to radiation, it is likely that the number is already very large."

Some 52 of the organization's 80 member-governments have so far endorsed proposals to establish a code of safeguards at the next meeting; no governments have disapproved.

Of those that have expressed their views, 31 want a firm, binding convention — not just a guide to domestic legislation. But 21 other governments, among them the United States, Russia, and Britain — the three countries most in advance of other nations in the handling of such materials—disagree. They apparently prefer a "recommendation" type of code.

Company Town Going

One of the last vestiges of an aging industrial practice seemed on its way out last week. With Securities & Exchange Commission approval, Du Pont announced that it will sell its mill village at Deepwater Point, N.J., near the firm's Chambers Works.

Building and renting residential housing to company employees was a widespread practice at the time of both world wars, and has also been prevalent among mining and textile firms.

It was designed as a means of attracting employees into areas difficult to reach, or where individual ownership posed a threat to worker security because of periodic recessions or playout of raw materials.

Du Pont owns — in addition to housing at Deepwater Village—some 140 other residential properties, which it proposes to sell from time to time as circumstances permit. Sale would be on a normal real estate basis, although employees presently leasing would be permitted first chance to buy, probably at or near a price set by Du Pont, recognizing improvements made over the years by the employee. If the employee shows no interest, property will go onto public listing. In the past, such sales by companies have frequently been to the advantage of the employees.

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Wyandotte CHEMICALS
MICHIGAN ALKALI DIVISION

PACING PROGRESS WITH CREATIVE CHEMISTRY

still own residential housing for employees. Many, however, in the years since the war have disposed of much that they owned. Among owners: American Cyanamid, Celanese, Allied Chemical, Union Carbide.

LABOR

Labor Violence: Violence marked the breakdown of talks at Olin Mathieson's Model City, N.Y., high-energy-fuels plants. At least 10 workers were injured in a fight when pickets surrounded a truck carrying four men to the plant gates last week.

Responding to a strike called by District 50, United Mine Workers, 350 production employees left their jobs — 250 workers at the recently opened Air Force plant and 100 at the Navy plant, in operation a year.

UMW is after its first contract since it won bargaining rights at the plants last February. Negotiators can't agree on wages and fringe benefits.

•

Sunday Pay: The South Carolina supreme court has ruled that workers at Celanese Corp.'s Rock Hill plant can't collect six years' back overtime pay for Sunday work. Plant workers had claimed they did not favor working on Sunday because of their religion and sought time and a half pay for prior work under a South Carolina law requiring such pay in textile plants. Celanese argued that a 1950 law exempted chemical fiber plants from this provision.

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Rubber Contracts: A just-settled contract between U.S. Rubber and the United Rubber Workers calls for improved pension, insurance and layoff benefits and a 60-day wage-reopening clause. The contract and supplemental unemployment benefit plan are 25-month agreements expiring June 1, '61, while the pension agreement becomes effective July 1 and expires July 1, '64.

A contract between URW and Goodyear has been arranged without a strike. Major provision — like that with U.S. Rubber—was an increase in pension benefits, for both retired workers and current employees.

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Drug Settlement: Sharp & Dohme Division of Merck & Co. settled with Local 12-86, Oil Chemical & Atomic Workers, for a 5% wage increase that varies from 9 to 16½¢/hour for production employees and 7 to 13¢/-hour for production-clerical employees in plants at Danville and Philadelphia, Pa., Rahway, N.J., and a research lab near Lansdale, Pa. The increase stems from a wage-reopener clause in a contract that expires May 1, '60.

Stockholders have voted approval of a stock ownership plan for employees at the firm's annual meeting.

•

Oil Independent: Central States Petroleum Union has kept its bargaining rights at Indiana Standard Oil's Casper, Wyo., plant. In the NLRB-sponsored election, CSPU won 369 votes, while OCAW received 110; there were two votes for no union. At Standard's Sugar Creek, Mo., plant last month, employees rejected CSPU.

LEGAL

Monsanto Trade-Secret Suit Ends: Monsanto Chemical Co.'s suit against Central Farmers Fertilizer Co. (*CW, Jan. 3, p. 42*) has been ended. In federal district court at Pocatello, Ida., where the St. Louis firm charged its trade secrets had been used illegally, Judge Fred Taylor signed an injunction consented to by both parties.

Under terms of the court order, Central Farmers is permanently blocked from disclosing certain process information and other technical data which Monsanto claimed as its trade secrets. The injunction also prevents Central Farmers from using the data for 10 years at any of its plants, except the now abuilding Georgetown, Ida., plant. Monsanto also was awarded reasonable inspection rights to insure compliance with terms of the court order.

This case was related to a court action by Monsanto against a former employee, Charles M. Miller, who subsequently became a Central Farmers' employee. Monsanto charged Miller with illegally taking process information, blueprints and other trade secrets relating to its elemental phosphorus operations and making this information available to Central Farmers. A permanent injunction was obtained (*CW, Aug. 9, '58*) against Miller last year, which prohibited his use and disclosure of the material. The Miller decision was not binding against Central Farmers.

Smog Law: Gov. Edmund G. Brown of California has signed into law the Rees-Richards Act, the first of a series of measures in his anti-smog campaign. The bill requires that the State Director of Public Health establish maximum allowable standards for emission of exhaust fumes from motor vehicles by Feb. 1, 1960. Once standards are set up by the state, directors of local air-pollution-control districts or the state could be authorized to prohibit the sale of cars if their exhaust fumes were greater than the State standards, or to require the use of auto exhaust control devices.

KEY CHANGES

John Peterson to general sales manager, Baxter Laboratories (Morton Grove, Ill.).

John Edward Kenney to director, Foster Wheeler Corp. (New York).

John L. Collyer, William S. Vaughn, to directors, Eastman Kodak Co. (Rochester, N.Y.).

Donald F. Brookland to vice-president for alloys, Tennessee Products Corp. (Nashville, Tenn.), subsidiary of Merritt-Chapman & Scott Corp.

John R. Allison to controller, Vick International Division, Vick Chemical Co. (New York).

Henry H. Henley, Jr., to director, McKesson & Robbins, Inc. (New York).

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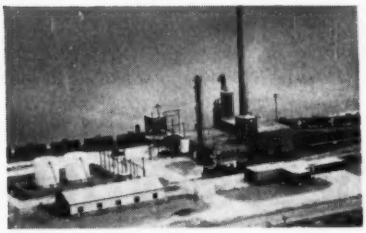

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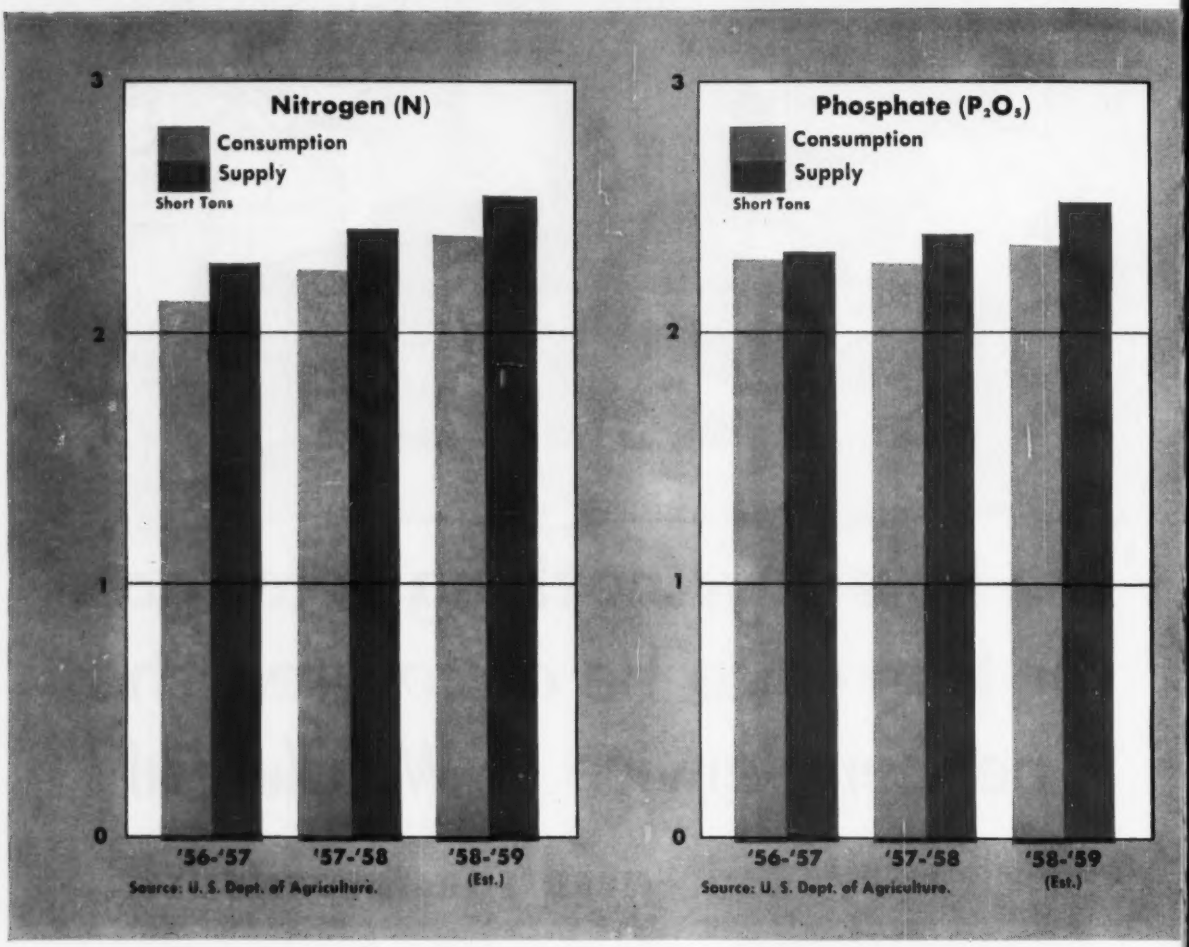

Fair Forecast Cheers Nation's

This week, farmers in the Midwest are opening wide their fertilizer hoppers in a flurry of spring planting activity that will spell out the '59 fortunes of the nation's fertilizer manufacturers. Contingent on continued good weather in Northern areas, and based on cheering reports from the seasonally advanced South, '59 has all the earmarks of a boom fertilizer year.

Underscoring this outlook is *CW*'s just-completed regional farm survey, which turned up a few problem spots but mainly revealed a happy balance of good weather and economic well-being on the part of the nation's farmers—two all-important factors that each year largely determine the health of fertilizer markets.

Money in the Pocket: U.S. farmers' realized gross income rose in '58, to a record high of nearly $38 billion, an 11% increase over '57. After deducting farm production expenses, realized net income showed even stronger gains, reaching $13.1 billion—20% above the '57 figure. This was the highest farm income since '53. And making the farmers' position even stronger, was the increase in inventories, which boosted total net income (realized net income plus the change in farm inventories) to $14.2 billion, 22% more than in '57.

The good economic position in which farmers found themselves at year's end meant an opportunity to pay off debts and establish better credit ratings; in most areas surveyed by *CW* this is what actually has happened. It means, of course, that there's little if any economic hindrance to increased purchase of farm chemicals this year.

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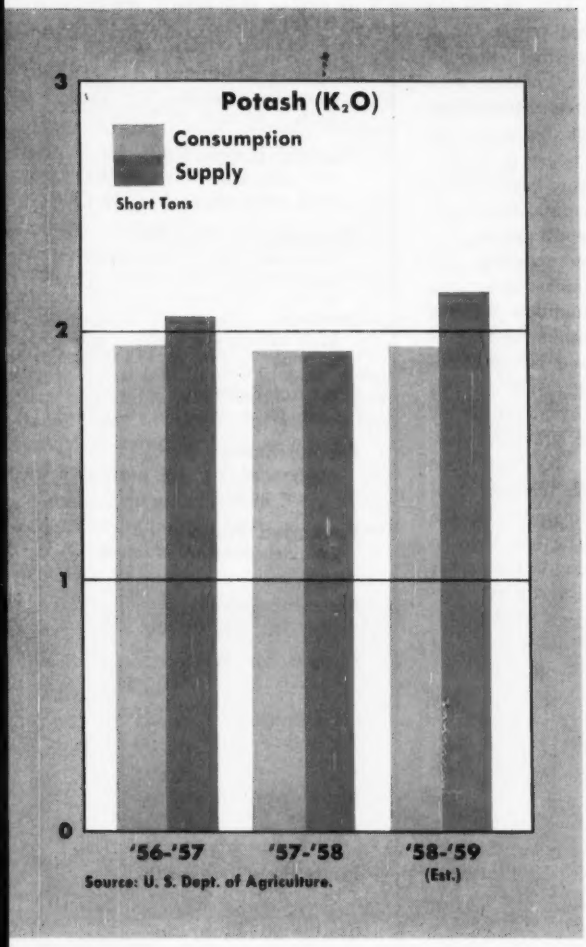

Fertilizer Makers

But one dim aspect is the government's recent forecast of an 8% drop in farm income during '59, to $12.1 billion. Reasons: rising production expenses and reduction in government subsidies because of elimination of the acreage reserve phase of the soil bank program.

However, many trade observers point out that a farmer's spending is pretty much determined by what he has in pocket, and the government forecast should not be too large a factor in his total outlays for farm materials such as fertilizer and machinery.

Acreage Boost: Preliminary planting intentions of farmers indicate that about 9 million additional acres of land will be planted this year, raising the total planted acreage to 339 million. Most of this land—which was out of production last year—will come out of the soil bank.

A large portion of the increased acreage will go into corn; preliminary reports indicate a total of 84 million acres will be planted during '59, 12% more than in '58. Largest increases are expected in the corn belt area of the Midwest.

Cotton crops will also be increased this year. Under the Agricultural Act of '58, farmers had two choices: either grow normal quotas of cotton and get relatively high federal price supports, or grow more cotton, get lower price supports. A relatively small number of farmers—69,000 operators—chose the lower-price plan. Consequently, original cotton allotments will increase by over 1 million acres. Reports indicate that close to 16 million acres of cotton will be planted this year, compared with 12 million in '57.

Education Pays Off: More nebulous to evaluate yearly is total effect on fertilizer consumption of many education programs aimed at sparking greater farmer appreciation of chemical soil control. Nonetheless, these programs* are paying off; reports from most agricultural areas indicate that farmers are doing more soil testing than in the past and—more important to fertilizer sales—are beginning to follow more closely the recommendations made by the various soil-testing groups.

Bolstering farmer interest in more-scientific methods of farming is hard competitive necessity; the modern farmer can no longer cling to outmoded and inefficient methods and expect to survive for long. Costs of labor, equipment and other overhead climb steadily; and it's clearly evident that fertilizer provides one of the cheapest methods of increasing dollar returns per acre. It's a point drummed into the farmer unceasingly by the fertilizer industry because most crops—excepting such products as tobacco—haven't yet reached the saturation point in fertilization.

Although all these factors set the stage for a good fertilizer year, nature is, of course, the deciding factor in some areas. If weather conditions are favorable, farmers will use more fertilizer. But, if rains are prevalent, delay planting, farmers may be forced to plant crops using minimum fertilization. (Long periods of drought also prevent the fertilizer from working into the ground; this results in a loss of materials and discourages the use of fertilizers.)

Southeast Sales Booming: In general, volume of fertilizer usage in most of the Southeastern states has been 15-28% greater than last year. However, comparisons are not entirely accurate, since the planting season is about two weeks ahead of normal schedule. Also, consumption of fertilizer from July 1, '57 to June 30, '58 was only 8.2 million tons—582,000 tons

*Farm education programs are sponsored by many types of organizations; i.e. federal and state governments, industry associations (e.g. National Plant Food Assn.), colleges, civic organizations, fertilizer manufacturers.

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less than the '57 fiscal year. Heavy downpours, and a poor planting season, were responsible for the large cutbacks during '57, but this area still accounted for about 37% of all the fertilizer consumed last year.

Good planting weather through most of the area* is credited with much of the increased consumption. But Florida is one area that will probably have a drop, as heavy rains during the planting season have slowed up fertilizer movements. Other sections of the area report strong demands for all fertilizer materials.

South Carolina is one outstanding example, with consumption for the last three quarters running as high as 28% ahead of '58; and North Carolina—largest consuming state in this area—also reports movements up by about 20% over the previous year. But trade observers say the pace won't continue because fertilizer consumption for the remainder of the season will probably be less than in the same '58 period, due to the earlier demand this year. Nevertheless, fertilizer consumption is expected to exceed the volume in '58; most observers peg the increase at about 8-12%.

Demand was so brisk during April that phosphate materials were in tight supply in some areas. Reason: unexpected demand for fertilizer materials during the year led to a shortage of sulfuric acid. According to one report, a Carolina manufacturer went as far west as Alabama to obtain enough of the acid to maintain production. The situation has been largely remedied, and producers say sales were not seriously affected.

Midwest Uncertain: Plantings in some of the Midwest states† have been delayed because of unseasonable weather. However, areas such as Indiana and Ohio show fertilizer tonnage moving well. Each of these states bought more than 1,000,000 tons of fertilizer during '58. The last fertilizer quarter, April-June, is the peak season for this area, and will determine whether '59 fertilizer consumption will exceed the '58 totals. About 7.9 million tons of fertilizer were consumed during '58, making it second only to the Southeast.

Corn acreage will be upped through-

* Southeastern states include Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama and Mississippi.

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out most of the area. Major additions will be reserve lands that are being put back into production, although reductions in the planting of other crops such as soybeans and oats will account for some of the acreage increase for corn.

It's still too early to predict what the final figures will show, but most observers believe total fertilizer sales will at least equal the '58 level, with a good possibility of showing an increase.

West Moves Early: In the West,‡ California is the most important agricultural area, consumes about 66% of the total tonnage of fertilizer used on the Coast. In '58, for example, California used 2.2 million tons of material, out of a total of 3.1 million tons for the entire area. Fertilizer sales in this state were off to an early start this year, with plantings starting around February. Demands during March and April were very heavy, and in some cases spot shortages occurred as manufacturers were unable to meet customers' immediate demands. Some of the materials affected were ammonia, ammonium nitrate, ammonium sulfate and some of the phosphate materials.

But in this area during the last few weeks, demand has softened, and the tally in May will likely be lower than in previous months.

As in many other states, allocation of more acreage to cotton is partly responsible for the increase in fertilizer consumption. However, the early growing season and the recognition by the farmer of the value of fertilizer are two other reasons for the increased demand in the West, observers say.

Although official figures are not available, most observers agree that the final tally of Western states' consumption will show a substantial increase over '58 figures.

Observers look for greater fertilizer consumption in the U.S. this year (industry estimates will be available in about a month and official government figures come out later in the year). They say there are gains not only in fertilizer tonnage but also in the concentration of plant food/ton of material, which would thus boost the total use of primary nutrients above '58 levels.

‡ California, Oregon, Washington, Nevada, Utah, Arizona, New Mexico, Colorado, Wyoming, Idaho, Montana.

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Robinette Research Laboratories, Inc. Industrial Research, Consultation. Technical and Economic Surveys. Product Development, Chemical Market Research, 16 East Lancaster Avenue, Ardmore, Pa. Tel. Midway 2-6457

"In Engineering It's the People that Count." Engineers and Contractors for the Petroleum and Chemicals Industries. The C.W. Nofsinger Co., East 63rd St., Kansas City 13, Mo.

CONTRACT WORK WANTED

Custom Grinding-Ultra Fine or Coarse-Specialty or Volume Blending and Grinding service on unit or contract basis. Complete CO_2 installation for Nylon, Teflon and Heat Sensitive Materials. A Cramer Corp., 10881 S. Central Avenue, Box 682 Oak Lawn, Illinois.

Idle space and equipment-Doughmixers, Mixing tanks, Wooden Vats, Pebble Mills, Homogenizer, Steam, Water, Etc. Small factory 35 miles from Chicago, Ill. CWW-1625, Chemical Week.

REAL ESTATE

Factory sites, 20 minutes form midtown New York, Newark Jersey City and Paterson. Two to ten acre plots avilable with R.R. and all utilities. Heavy or light industry. Write owner, P. O. Box 26, Carlstadt, N.J.

Restricted For You—Not Against You—A New unique concept in Industrial Terminals is now being developed within the skylines of Manhattan, for companies requiring heavy industrial zoning. Existing buildings avilable from 1,000 to 50,000 sq. ft. on a lease purchase, or buildings erected to suit. All utilities plus rail and high press. steam. Louis Schlesinger, Company, 901 Broad St. Newark 2, N.J. MArket 2-6500.

FOR SALE

30 drums Dibutyl Maleate (off-color) 15¢ per lb., 2 drums Carbitol Acetate 20¢ per lb. Carbon Tetrachloride 7.5¢ per lb. in bulk. Competitive Lacquer Thinner (regular basis) 30¢ per gal. in bulk. Chemsol, Incorporated, 74 Dod Street, Elizabeth, New Jersey, Telephone - Flanders 1-2021.

Mikro-Atomizer #5, Type MA, 5 hp, totally enclosed, fan cooled motor and starter, 1/20 hp, feed screw, 2 Nylon bags. Van Dyk Laboratories, State Highway #10, Morris Plains, N.J.

WANTED

Used Laboratory cabinets, furniture, sinks, tables, fume hoods, etc. Write W-1639, Chemical Week.

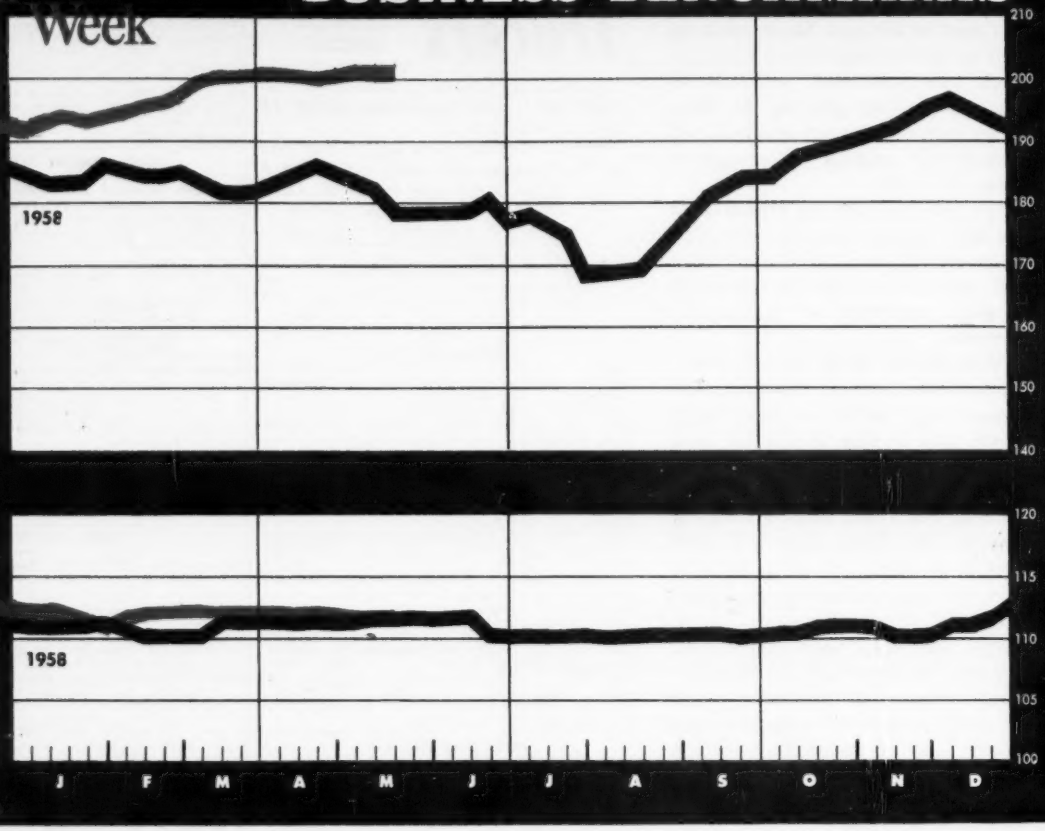
WANTED/FOR SALE

This Tracer Section can be used whenever you are looking for or offering Equipment, Plants, Supplies, Chemicals, Opportunities, Special Services. The rates are low—just call or write Classified Advertising Division. Chemical Week, P.O. Box 12, N. Y. 36, N. Y., LOngacre 4-3000.

MISCELLANEOUS

To Employers Who Advertise for Men: The letters you receive in answer to your advertisements are submitted by each of the applicants with the hope of securing the position offered. When there are many applicants it frequently happens that the only letters acknowledged are those of promising candidates. (Others do not receive the slightest indication that their letters have even been received, much less given any consideration.) These men often become discouraged, will not respond to future advertisements and sometimes even question if they are bona fide. We can guarantee that Every Advertisement Printed Is Duly Authorized. Now won't you help keep our readers interested in this advertising by acknowledging every application received, even if you only return the letters of unsuccessful applicants to them marked say, "Position filled, thank you." If you don't care to reveal your identity, mail them in plain envelopes. We suggest this in a spirit of helpful co-operation between employers and the men replying to Positions Vacant advertisements. Classified Advertising Division, McGraw-Hill Publishing Company. "Put Yourself in the Place of the Other Fellow".

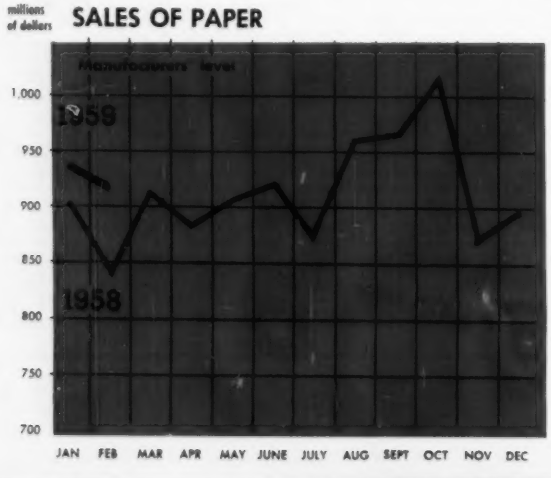
BUSINESS BENCHMARKS

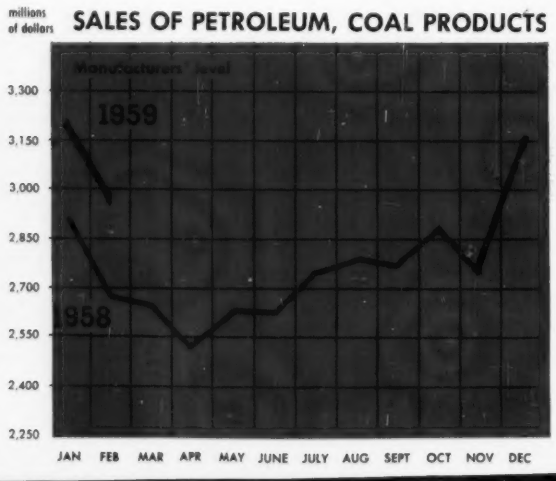


MAY 16, 1959

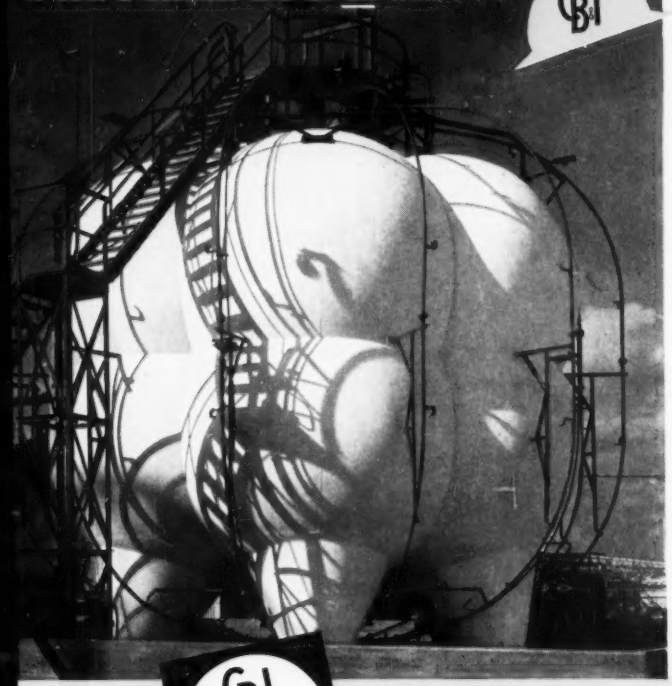
WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1947-1949=100)	201.5	202.0	179.5
Chemical Week wholesale price index (1947=100)	112.4	112.4	111.0
Stock price index (11 firms, Standard & Poor's)	57.38	56.02	93.25
Steel ingot output (thousand tons)	2,668	2,627	1,334
Electric power (million kilowatt-hours)	12,546	12,538	11,251
Crude oil and condensate (daily av., thousand bbls.)	7,112	7,132	6,256

MONTHLY INDICATORS—Trade (million dollars)	Manufacturers' Sales: Latest Month	Manufacturers' Sales: Preceding Month	Manufacturers' Sales: Year Ago	Manufacturers' Inventories: Latest Month	Manufacturers' Inventories: Preceding Month	Manufacturers' Inventories: Year Ago
All manufacturing	28,544	28,143	25,542	49,763	49,503	52,445
Chemicals and allied products	1,958	1,932	1,783	3,750	3,764	3,848
Petroleum and coal products	3,079	3,043	2,759	3,264	3,261	3,542
Paper and allied products	972	942	877	1,470	1,451	1,453
Textile products	1,123	1,102	1,001	2,461	2,487	2,638





The containment of modern fuels and materials is both a business and an art with . . .

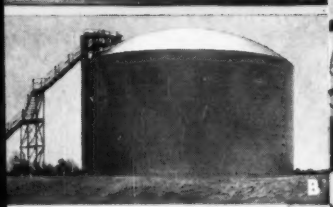


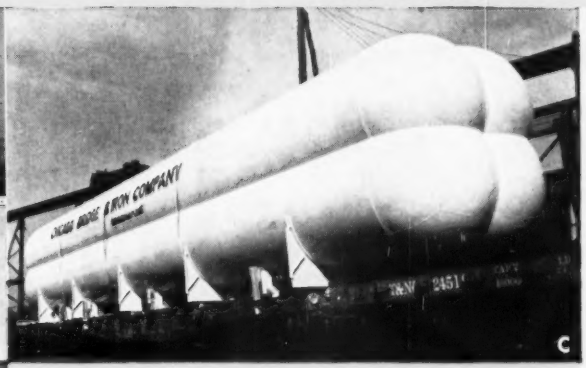
Chicago Bridge & Iron Company offers a complete and fully coordinated facility for the engineering, fabrication and erection of structures and vessels to contain and store modern fuels, chemicals and other process materials: in gas or liquid form, at high or low pressures, and at high or low temperatures.

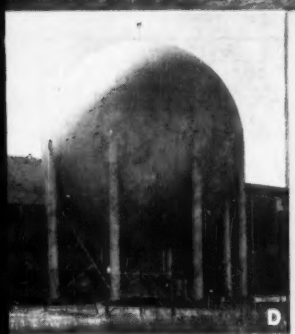
Included in the CB&I Services are facilities for metallurgical control, stress-relieving, X-ray and welding—and techniques developed during nearly 70 years of service to industry. Five strategically located CB&I plants are staffed and equipped to serve your *specific* requirements for corrosion resistant metals for solid, lined or clad steel, alloy or non-ferrous construction.

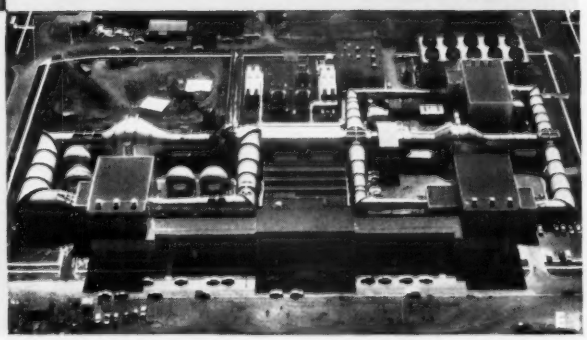
A few typical installations are shown and described below. Of particular interest, is HORTONCLAD®—a new vacuum bonding process which makes it possible for CB&I to produce composite plates in a larger range of combinations than has previously been available. Write our nearest CB&I office for the new bulletin on *Hortonclad* and literature on *CB&I Special plate structures.*

See for Creative CRAFTSMANSHIP IN STEEL









TOP, LEFT—14-lobe MULTISPHERE designed, fabricated and erected by CB&I to store 100,000 gallons of liquid methyl chloride at 150 lbs. working pressure. Design offers optimum versatility for pressure vessels.

A—5052 ALUMINUM was used for these ammonium nitrate storage tanks.

B—LIQUID PROPANE is stored by refrigeration at 1½ lbs. working pressure at minus 44° F in this unique 70-ft. diameter tank, designed and built by CB&I.

C—MULTICYLINDER Multi-lobe pressure vessels such as this offer advantage of high pressure storage where space is limited. Vessel is designed for 250 lbs. working pressure.

D—VACUUM SERVICE is provided by Hortonsphere® at a University of Toronto wind tunnel installation.

E—TUNNEL SECTIONS for wind tunnel were fabricated and erected by CB&I. A supersonic wind tunnel for Convair Division of General Dynamics was recently completed by CB&I as a "turnkey" project.

PRESSURE VESSELS • REFRIGERATED STORAGE • VACUUM SERVICE • HORTONCLAD® • ENGINEERING • FABRICATION • ERECTION IN ALL METALS AND COMBINATION METALS

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